BULLETIN

OF THE

AMERICAN GEOGRAPHICAL SOCIETY.

Vol. XXXVIII 1906. No. 9

LABRADOR, FROM LAKE MELVILLE TO UNGAVA BAY.

BY

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In the northeastern portion of the Dominion of Canada is the great Labrador Peninsula, which, though first to be discovered, is of all the regions of North America the last and least explored. North of the fifty-fourth parallel it is nine hundred miles in extent from Hudson Bay on the west to the Atlantic Ocean on the east, and between its southern boundary, the Gulf of St. Lawrence, and its extreme northern point at Hudson Straits lie eight hundred miles of almost unbroken wilderness. The peninsula is estimated to contain 511,000 square miles, its interior being a vast elevated, rocky, irregular plateau, in places standing well out to the coast and cut by valleys down which great rivers carry to the sea the waters of its myriads of lakes and streams.

Knowledge of the interior of the peninsula was until the sixties confined to that obtained by the agents of the various Hudson's Bay Company's posts established at long intervals on the coast and in the interior; but, in accordance with the policy of the Company, their findings were not recorded. One notable exception to this rule was that of John McLean, to whom falls the honour of being the discoverer of the Grand Falls of the Hamilton River. In 1838, 1841, and 1842 he crossed and recrossed the country lying between Lake Melville and Ungava Bay; but the accounts of these journeys which appear in his "Twenty Five Years in the Hudson Bay Territory" are very incomplete, and he left no maps.

In 1862, Henry Yule Hind made his survey of the Moise River. In 1887, Dr. R. F. Holmes, an English traveller, made an attempt to reach the Grand Falls of the Hamilton, two hundred and fifty miles

above the mouth of the river, but was obliged to return without accomplishing his purpose, his crew proving inefficient and his outfit inadequate. In 1892 two expeditions from the United States reached the Grand Falls—one from Bowdoin College under Messrs. Carey and Cole, and the other under Mr. Henry G. Bryant, recently President of the Philadelphia Geographical Society.

But the great Labrador explorer is Mr. A. P. Low, Director of the Geological Survey of Canada. More than that of all others, his work has tended to dispel the darkness of mystery so long shadowing the interior of the great peninsula. Yet Mr. Low's work, which extended over a period of ten years, and which is set forth in the reports of the Geological Survey of Canada, had left the northeastern portion, lying between Lake Melville and Ungava Bay, still virgin field for the explorer, where remained two large rivers to be traversed and mapped.

On the 15th of July, 1903, Leonidas Hubbard, Jr., my husband, with two companions, set out from Northwest River Post, near the head of Lake Melville, for a canoe trip into the interior, which he hoped would not only afford him an interesting wilderness experience but also an opportunity to explore and map one, and perhaps both, of these rivers, the Northwest River draining Lake Michikamau to Lake Melville, and the George River draining the northern slope of the plateau to Ungava Bay.

Misled by information obtained at the post, which corresponded with the indications of the map he carried, that of the Geological Survey of Canada, Mr. Hubbard took the Susan River, which enters Grand Lake at its upper extremity, instead of the larger river draining Lake Michikamau and entering Grand Lake at the head of a bay five miles from its western end. The Susan River led them, not by an open waterway to Lake Michikamau, but up to the edge of the plateau, where they became lost in the maze of its lakes. When within sight of the great lake the party was forced to begin a retreat which Mr. Hubbard did not survive to complete, and the object of his expedition was not achieved.

Nevertheless, in utter physical weakness, utter loneliness, in the face of defeat and death, he yet wrote that final record of his life, so triumphantly characteristic, which turned his defeat to a victory immeasurably higher and more beautiful than the success of his exploring venture could ever have been accounted, and thus was compassed the higher purpose of his life.

That his lesser purpose might not remain unaccomplished, I myself in 1905 undertook the conduct of the second Hubbard Ex-

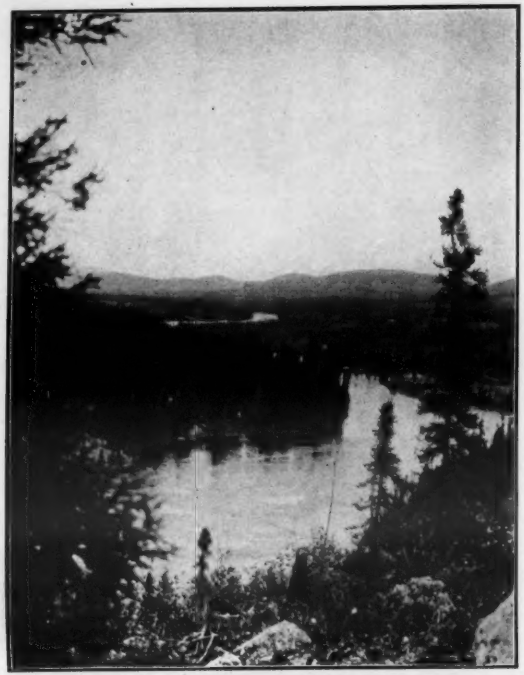


FIG. 1.—EMERGING FROM THE HILLS TO CROSS THE SAND PLAIN, UPPER NASCAUPEE.

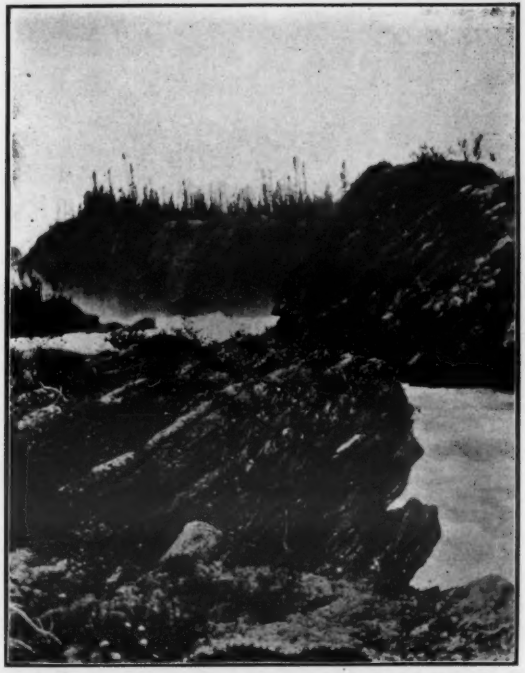


FIG. 2.—GORGE BELOW MAID MARION FALLS.

pedition, and, with the advantage of the information and experience obtained by the first, a larger crew and a three weeks' earlier start, successfully completed the work undertaken two years before. The map which this article is intended to accompany sets forth the work I was able to accomplish. It does not claim to be other than purely pioneer work. I had with me a surveyor's compass and a sextant and artificial horizon. I took no observations for longitude, but obtained a few for latitude, which served as guiding points in making my map. Owing to the fact that I depended on water instead of taking mercury with me for my artificial horizon, a number of observations were lost because of the ease with which the surface of the water was disturbed and the gathering of moisture on the glass. The controlling points of the journey were already astronomically fixed.* The shores of the lakes were not explored, but outlined as they appeared from the canoe or from the top of a hill.

The map of the route of the first Hubbard Expedition is from one drawn for me by George Elson, with the few observations for latitude recorded by Mr. Hubbard in his diary as guiding points. Mr. Hubbard's note-book, containing his maps and other records, I have not had access to.

My expedition left Northwest River Post 3.30 P.M., June 27th. I had two canoes and four guides, chief among whom was George Elson, who had loyally served Mr. Hubbard in 1903, and who had, with a rare skill and a rarer devotion, recovered Mr. Hubbard's body, his records, and his photographic material from the interior, in the depth of the following winter. My supply of provisions totalled 750 lb., the complete outfit weighing 1,000 lb. July 17th found us at the head of Seal Lake. August 2nd we made our first camp on Lake Michikamau. August 10th we arrived at the Height of Land, and in seventeen days made the run down the George River to the post at Ungava, arriving there at 11.20 A.M, August 27th.

The Nascaupee River may be said to have its origin in Lat. 54° 50′ and W. Long. 64° 30′, at the edge of the Height of Land, its course from this point to the ocean describing a somewhat awkward-looking letter W. The distance in a straight line to its discharge into Lake Melville is two hundred miles, but following the windings of its course is about three hundred miles. From the Height of Land a series of lake expansions stretches nearly one hundred miles east of south, the last and largest being Lake Michikamau, of all the lakes of the interior second only to Mistassini in size. It is sixty

* Northwest River Post, Lake Michikamau and its outlet, and the mouth of the George River.

miles long and twenty-five miles in width at its widest. The Nascaupee River issues from the lake to the east a few miles north of Lat. 54°. The outlet is partly concealed by a large island to the south, and the river flows from the lake round a low wooded point, breaking into rapids as it spreads about the islands in the upper end of Lake Agnes. Its course is now northeast to Seal Lake, the first fifty miles being through the great plain of the lakes, where MacKenzie and Fremont are its largest expansions.

Here a thousand lakes spread over the country, separated from Lake Michikamau by a low ridge extending northward along its eastern shore. Across the plain from east to west stretches a succession of low wooded ridges, seeming to become higher and more barren in the north. The wood growth is of small spruce and larch, unrelieved by the touch of white birch and poplar found in plenty on the lower levels, and the ridges extend eastward to the long portage and beyond, and are separated from the great irregular hills which occupy the country west of Seal Lake by a broad sand plain. To the south of the lakes the country is more rugged and barren, big rocky hills standing out towards Lake Michikamau.

At the foot of Lake Marie the river descends from the plain at Isabella Falls, a system of falls and rapids and chutes extending for more than a mile, where the water rushes over ledges, round rocky islands and through miniature cañons, an abrupt right angle bend midway of the descent adding to the wildness and picturesque beauty of the scene. The rock, which is Laurentian, is rich red brown, almost purple in colour, and its perpendicular surfaces are patched with a close grey-green moss and a variety the colour of vermilion. Islands and shores are wooded, and the dark spruces stand out in strong relief against the white of the reindeer moss. From this point eastward to beyond our long portage, which is as far as the wooded country extends, there is a perceptible difference in the size of the trees, those in the sheltered river valley attaining a larger growth than those on the plain above.

For the next seven miles the river drops rapidly. Two wild and impassable rapids occur before reaching Gertrude Falls, where the river takes a direct drop of about sixty feet, flowing on in almost continuous rapids to the next drop at Maid Marion Falls. Here it descends fifty feet into a narrow channel cut out in the gneiss and schists of the Laurentian, emerging from the hills ten miles below to a terraced sand plain four miles wide. Beyond this it passes through the sea of hills west of Seal Lake. The main drop in this part of its course takes place in a fall of a few feet a short

FIG. 5.—GRAND LAKE. CAPE CORBEAU 15 MILES AWAY.

FIG. 3.—WHERE THE NASCAUPEE LEAVES SEAL LAKE.

FIG. 5.—GRAND LAKE. CAPE CORBEAU 12 MILES AWAY.

distance below the plain, and at Cascade and Seal Rapids, though there are a number of smaller rapids. There is little green wood along this part of the river, the country here and around the northern part of Seal Lake having been burned over long ago. It is now grown up with poplar and white birch, from the midst of which the rocky hilltops rise bare and stern. A few small lake expansions occur, Wachesknipi being the largest. Here the country flattens out again to low sand ridges, and the river, bending a little to the south, enters Seal Lake.

From the northern extremity of the lake an arm, which, according to the trappers, is thirty miles long, extends away to the west. As far as we could see, the hills along its south shore drop abruptly to the river, like the Palisades of the Hudson. The course of the river is to the south, the lake contracting seven miles down to about three hundred yards in width, where perpendicular cliffs rise from the water edge and the current is very swift. The lake is surrounded by hills, the wildest and most rugged region being that about the outlet. It lies close to the edge of the plateau, and, from the point where the river leaves it, the water breaks into tossing rapids. From here to the northern extremity of Bald Mountain the river is still unexplored. According to the trappers, it rushes down a continuous rocky slope, the hills in places rising perpendicular from its edge.

Below the bend at Bald Mountain the direction of the river is southeast to Grand Lake. Its course lies mainly through sand hills and terraces, its banks varying from a few feet to sixty and eighty and one hundred feet in height. The valley is mostly well wooded with spruce and balsam as far as Mabelle Island, and here the spruce reaches splendid size. The trees are very tall and straight, and one I measured was nine feet in circumference. Below the island the country was swept by fire twenty-five years ago, and the new growth is still quite small. Among the hills Bald Mountain and Mts. Elizabeth and Sawyer are the most prominent features, being apparently more than a thousand feet in height. From Bald Mountain the rapids are continuous to Point Lucie, below Mt. Sawyer, the heaviest being North Pole and Three Mile Rapids. The remaining seventeen miles to Grand Lake is smooth water, though the current continues swift, and the river enters the lake around a number of small wooded islands, which entirely obscure it from the lake.

Grand Lake is forty miles long and four miles wide, and is very deep. It lies south of east among its hills, the highest and most striking of these being Berry Head on the north shore, and Porcu-

pine Hill, Cape Blanc, and Cape Corbeau on the south. From the eastern extremity of the lake a three-mile stretch of rapid river carries its waters to Lake Melville, where, together with those of the Grand or Hamilton, they pass northeast, entering the Atlantic north of the 54th parallel.

Throughout its length the Nascaupee receives tributaries of considerable size, on the upper river the principal contribution coming in from the north. Its waters are clear and cold, though some of the streams which enter it below Seal Lake are red brown water. On June 29th I found its shores at the foot of Three Mile Rapid lined with ice banks eight and ten feet thick, though above them violets were in bloom. On August 3rd we saw large masses of ice, like miniature bergs, floating in Lake Michikamau. Almost throughout the length of the river there was the border of tangled Arctic willows, which grow to a height of six and eight feet, and in many places broom birch covered its low drift islands and shores. On the islands of Lake Michikamau and some of its more exposed points the spruces were sometimes dwarfed and distorted by the storms; and farther north, about the Height of Land, where the country is flat and boggy, the wood growth consists mainly of tamarack with small spruce interspersed, many of the tall, slender tops of the former being completely bent over, telling of the rigours of the climate.

Standing on a slight elevation near the Height of Land, I had the feeling of being at the summit of the world. The country seemed to fall away, especially to north and south. The line of the horizon seemed too near to be natural, and there was more than the usual realizing sense of the great space between the earth and sky. This was emphasized by the lifting of a far-distant hilltop above the line, as if in an attempt to look across the divide.

The middle source of the George River is in Lake Hubbard, immediately north of the Height of Land, so that it may be accounted to take its rise in practically the same latitude and the same longitude as the Nascaupee. Its course is west of north, and for more than fifty miles it consists of a series of lake expansions of varying sizes, whose waters drop from one to another down shallow rapids. About the lakes the country is quite flat, low ridges beginning to appear as we passed northward. Five miles below Cabot Lake the east branch of the upper George comes in, a stream apparently almost equalling the middle river in volume, and twelve miles farther down the west branch, which drains Attikamagen Lake near the Height of Land to the southwest. Ten miles beyond Resolution Lake the river drops

FIG. 4.—ON THE TRAIL. UP-HILL WORK, NASCAUPEE RIVER.

FIG. 7.—SHOOTING THE RAPIDS, GEORGE RIVER

down through three rocky gorges at Cañon Camp, the lake expansions of the upper country are left behind, and the George River now flows with strong, swift current in a distinct valley. From a few miles below the camp the country is burned over, and is exceedingly desolate, the hills being barren even of reindeer moss. These hills become higher, till below Thousand Island Expansion they rise between six hundred and seven hundred feet above the river.

The river here flows for about two miles in falls and heavy rapids round islands of pink-and-white rock, beyond which the descent is less precipitate. In the next six miles two heavy rapids occur, at the second of which the river descends to flow between high sand banks, the hills standing back some distance from its shores, their broken faces red with a coating of iron rust. The intervening spaces are strewn with boulders of unusual size. Some miles below a large tributary comes in from the west, the river turns abruptly northward among the higher hills and spreads to the Barren Ground Water.

This expansion is somewhat more than fifty miles in length and from one to two wide. It is shut in on either side by high hills, which in places on the east shore rise abruptly from the water edge, but on the west usually stand a little back from the lake, the intervening spaces being filled in with sand. Long, high, wedge-shaped points of sand and loose rock reach out here and there from the west shore, which in places slopes back to the hills in high terraces, the highest more than one hundred and fifty feet above the lake. Streams fall in from either shore at short intervals, but throughout the length of the river by far the larger contribution comes in from the east.

From the foot of the lake the George begins a swift descent to Ungava, flowing for more than one hundred and thirty miles in almost continuous rapids. The slope of the river-bed is in many places like that of a steep grade; and as the water swings past the long points of loose rocks which reach out from either shore, there is not only the slope down the course of the river, but a distinct tilt from one side to the other, as when an engine rounds a bend. There are foaming breakers where the water flows over its boulder shallows; but again the river is so smooth as to seem almost motionless, even where the slope downward is distinctly perceptible. A few small expansions occur where the hills stand farther apart, and in places serpent-like sand ridges reach in from the hills on the west. River terraces occur, those opposite Pyramid Mountains being particularly well marked. One of the most characteristic features of

the lower river is the great wall of packed boulders thrown up by the action of the ice during the spring floods. Some of the rocks are of immense size, and usually the largest of them are found at the top. The wall varies in height from twenty feet at its beginning, thirty miles below the Barren Ground Water, to fifty and sixty feet farther down; and a short distance below our camp of August 24th a long bank of ice from three to four feet in thickness was still clinging to the boulders half way up from the water.

The country becomes more and more mountainous and rugged and barren. The wood growth, which is of spruce and larch, with, at intervals, a little balsam, is for some distance below Barren Ground Water rather more luxuriant than along the lake shores. At best it is but a narrow belt along the water, covering the hillsides to a height of perhaps two hundred feet, and dwindling gradually towards the north till in places it is absent altogether. The ridges on either side cross each other almost at right angles, turning the river now to the northeast, again to the northwest. Down the mountain sides broad bands of white show where the waters of numberless lakes and streams on the heights come tumbling down to join the river, and again a great gap in the solid mountain of rock lets through a rush of blue-green foaming water. The mountains on the right bank seem more rugged and irregular than those on the left, and Bridgman Mountains stand out to the river quite distinct and separate, like giant forts. The hills have the characteristic Cambrian outline; and it is the opinion of Mr. Low that this formation extends continuously eastward from the Kaniapiskau to the George.

Below Helen Falls the mountains spread in a wider sweep to the sea and the river gradually increases in width to its discharge into Ungava. Two heavy rapids occur below the limit of tidal influence which are obliterated at high water. At the foot of the lower of these there is forty feet of tide at the spring. In The Narrows beyond the post the outgoing water rushes in a long, smooth curve over an enormous boulder lying near the centre of the stream, to curl back in a great breaker the roar of which can be heard for miles. Ungava Bay has a spring tide of fifty feet, which at its rise fills the coves till below The Narrows the river is in places seven miles in width.

The game supply of the country traversed we did not find abundant, though it should be said no hunting was done off the route followed. On the lower Nascaupee our take consisted of a few porcupines, rabbits, partridges, and muskrats. There were signs of

FIG. 6.—LOWER NASCAUPEE. SAND HILLS AND ICE BANKS.

FIG. 8.—GEORGE RIVER RAPIDS AND MOUNTAINS.

beaver, marten, and otter, many bear trails, though we saw but one bear, a black one, and only once on the lower river did we see fresh caribou tracks. Seals played at the foot of Three Mile Rapid, and later we saw a number of them in Seal Lake and above Seal Rapid. On the upper river a few black ducks, Canada geese, spruce partridges, willow ptarmigan, were taken, and two days' journey above Seal Lake our first caribou.

On the west shore of Lake Michikamats, August 8th, we came upon the caribou migration, and saw one herd in which there were thousands. Though we did not again find them in such numbers, yet for fifty miles of our journey they were seen in smaller herds every day, and sometimes many times a day. They were in summer dress of pretty brown shading to grey and white on the under parts. The antlers were in velvet and of immense size, and males and females were already herding together. Apparently they had been in occupation of the country for some time. From Ptarmigan Point, on Lake Michikamats, to the head of Long Lake, on the George River, the country was a network of their trails, in the woodlands and bogs cut deep into the soil, on the barren hillsides broad, dark bands converging to the crossing-place at the river. North of the Height of Land we passed at intervals long piles of whitened antlers; and along the shore opposite our camp of August 15th, a broad band of white caribou hair, four feet above the river, told of their crossing and recrossing while shedding the winter coats.

Only once in passing this part of the country did we find trace of their enemy the wolf. Throughout the journey we did not see any, but once, while running down the lower George River, a lonely cry came down to us from one high up on the mountain side.

Through the caribou belt other game was more abundant also. Every day mother ducks with their flocks of little ones were seen, and a number of geese were taken. Gulls and loons were there in numbers, and ptarmigan were very plentiful as far as the head of the Barren Ground Water; but beyond, none were taken till we reached the post. Along the lower part of each of the rivers signs of foxes in large numbers were found, and the lemmings on which they feed made us not a little trouble. They were about in thousands, and the ground was so perforated with their holes as to remind one of a porous plaster.

In the lakes fish seem abundant, though we travelled too fast to do much fishing, and the nets were not once in the water. In the

lakes are the brook trout, ounaniche, and namaycush, some white fish, and in the lower George the sea trout and salmon.

The flowers are beautiful, though not so varied as in the home country. All along the Nascaupee blossoms of the Labrador tea filled the air with their fragrance, and pale laurel grew in abundance. Now and then we crossed great beds of blossoming cloudberries, and everywhere the star flower and bunchberry showed their white blossoms. One day, while ascending the Wapustan River, Gilbert handed me a dandelion, and during the day I saw several of them, but did not again find them throughout the journey. On the upper Nascaupee the dainty pink bells of the low cranberry showed in the carpet of glossy green, and near the water, along the low drift shores, the pink, almost rose-like, blossom of the dewberry. Violets grew on both rivers, but most beautiful of all was the twin flower, which I first found growing on the sandy terraces beyond the hill country west of Seal Lake. It was the delightful fragrance which first attracted my attention, and looking down I saw the long trailing vines from which the pink twin bells are lifted on slender, hair-like stems. It grows even more abundantly on the sandy shores of the George River, and at the post at Ungava masses of this beautiful flower, so rare and treasured here, creep along the foot of the mountain, while indoors, in a pot on the windowsill, Mrs. Ford, the agent's wife, carefully treasures two tiny clover plants, in her eagerness almost afraid to believe that they are really clover.

During the journey, which occupied the two months from June 27th to August 27th, the weather was wonderfully fine. There was not the continued downfall of rain nor any of the extreme heat, which told so heavily against Mr. Hubbard in 1903. We were in camp only eleven days on account of the rain, and the highest temperature reached was 77° F. in the shade. The lowest recorded temperature was 30° F., which was not, however, the minimum reached. As we passed into the higher lake country the clear nights were frosty, and on the morning of August 10th, at the northern extremity of Lake Michikamats, there was a coating of ice an eighth of an inch thick on a basin of water left outside the tent overnight. While descending the upper George my duffle was sometimes frozen stiff when I came to put it on in the morning; and on August 13th, 14th, and 15th we had snow flurries, as well as heavy rain and wind.

Thunderstorms were rare, and very mild as compared with those in the United States. On many days which were very beautiful there were passing showers, and Labrador is a land of rainbows. Nowhere have I ever seen their colours so brilliant or so variedly

FIG. 109.—BRIDGMAN MOUNTAINS, LOWER GEORGE RIVER.

FIG. 9.—WALL 50 FEET HIGH ON LOWER GEORGE RIVER.

FIG. 10.—BRIDGMAN MOUNTAINS, LOWER GEORGE RIVER.

FIG. 11.—CARIBOU TRAIL, PTARMIGAN POINT, LAKE MICHIKAMATS.

manifested. They did not always appear in the form of a bow, and once I saw them lie like a beautiful veil along the whole length of Rainbow Hill on the upper Nascaupee. There was a wonderful clearness in the atmosphere, which made landmarks miles away seem very near and clothed the far-distant hills with colour indescribably beautiful. In the blue of the hills and the waters and the sky there was a peculiar silveriness, which, with the white of the reindeer moss and the dark green of the spruce forests, touched in places with tender green of the white birch and poplar, made a combination of colour which I think can scarcely be surpassed in beauty anywhere in the world. In a way which I could neither describe nor understand, it was comforting.

The flies and mosquitoes, for which the country is famed, did not wholly fail of accomplishing their dire designs upon us; but their ravages are easily forgotten in the remembrance of the beauties of that lone land which can smile with so much grace, even though its mood has sometimes been one of such persistent cruelty.

IMPRESSIONS OF A NATURALIST IN BRITISH GUIANA.

BY

PROF. ANGELO HEILPRIN.

When in 1825 Charles Waterton published his delightful "Wanderings in South America" he gave to the world the first picture of what Anthony Trollope has called the "true and actual Utopia of the Caribbean Seas, namely, British Guiana." In it we have presented one of the most fascinating introductions to a region of charm and beauty—an impression of nature which is scintillant with the glories of the field and forest, that mocks, however rudely, the labour of the systematist and cabinet, that invites to hidden secrets in a largely unknown world. The "Wanderings in South America" has doubtless been to many one of the earliest books of travel to inspire, and it has always seemed to me to be the impelling force which through many years has held up the vision of a journey to the great primeval forest of the south. Therefore, to its author *nominatim* I surrender "a certain portion of the honours" that may come to me from my recent and exceedingly modest journey; for, as he says, "As Ulysses sent Achilles to Troy, so I sent him to Guiana."

If Surinam, the close neighbour and parent of British Guiana, can be properly likened, as has been done by Palgrave, to the Biblical paradise simply because it is "a very pleasant place" and not over-progressive, so, for like reasons, the comparison might be extended to cover the British colony, in which the moulding of man and his methods sees before it a long future. The similarity, if it does not extend much beyond the two conditions which it specifies, has other elements that may be thought to justify a comparison. A free, untrammelled Nature tends toward *paradisism*, and there are few regions of the earth's surface where the encroaches of man have done less to modify wild nature, or to take from it its majestic solemnity and grandeur, than the wilds that stretch in one almost unbroken sweep from the mouth of the Orinoco to the lower basin of the Amazon. It is here that the great primeval forest, the almost pathless solitude that has made classic the descriptive writings of Humboldt, Von Martius, Schomburgk, Bates, and Wallace, still gathers in its darkness from a region of almost no trespass, and unfolds itself in a magnificence that is perhaps not to be matched elsewhere. The continuous forest of the Amazon-Orinoco basin covers not less than 2,000,000 square miles; and, it may be, considerably more, and in its region of vast trackless woods there is hardly a gateway to the interior, barely a road or path, and virtually no line of travel-communication except where nature has set those water-highways which, even as secondary rivers, pour out their waters in volumes exceeding those of the Volga, the Danube, the Rhine, or even the Mississippi.

Most travellers receive their first impressions of British Guiana on their arrival at the capital city, Georgetown (more commonly designated from the country in which it is situated, Demerara), but before this, and for many miles out to sea, he will have noted a characteristic of the land in the yellow-brown waters that lie outside, the sediment that rolls out in floods or is gathered in from the discharge waters of the Orinoco. The Amazon seems to have little part in this discoloration; for, if my information is correct, much of the off-shore of French Guiana and the land lying still farther to the eastward are bathed by a clear sea. Back of the fringe of muddy water the eye follows the low contour of a bordering grove of mangrove, and beyond it in some places, or replacing it elsewhere, the glass may resolve a somewhat loftier growth of willow-like bushes, or even trees, the courida (*Avicennia nitida*). In the distance, less lofty than the occasional chimney that tells where the sugar-cane is being grown, or where it was

cultivated until competition with the sugar-beet broke the back of the most important, albeit steadily failing, industry of the colony, are a few specimens of the royal and cabbage palms (*Oreodoxa regia, Oreodoxa oleracea*), and the landscape is virtually complete. There is not a rise in the land that even remotely suggests a hill, and it is in faith only that the mind constructs the landscape of lofty mountains in the far interior. Nearing the land, a space of some three-quarters of a mile between the growths on either side invites to where the Demerara River opens out to sea, and on the river, a short distance up the right bank, lies Georgetown.

The capital city does not particularly concern the naturalist, except for its botanic garden and experiment station, its charming avenues of trees, and the open water-ways, the so-called "canals" of the city, which are magnificently grown with the *Victoria regia* and the equally beautiful large-flowered water-lily and lotus. I had heard much of these open canals, but rarely a word regarding their attractiveness. Residents of the city are habituated to this display of floral wealth, but to the newcomer, to the one who knows these glories of vegetation only from the isolated specimens in botanic gardens, the spectacle is a ravishing one, however closely it may be associated with the prosaic topic of city drainage.

From the moment that the traveller has set foot on Georgetown soil he has made friends with that lovable and seemingly always cheerful laniine bird, the kiskadee (*Pitangus violaceus*). *Qu'est-ce-que-dit?* comes from the tree-tops overhead, from orchards and gardens, and from your hotel window-sill. Throughout all the hours of day and through many of the hours of semi-day this sprightly interlocutor plies his little inquiry, not waiting nor caring for a reply. In that part of town which insensibly removes to country, a more direct call upon the stranger may be made in the quizzical and surprisingly human "Who-are-you? Who-who-are-you?" of the native whippoorwill—a voice which, when once recognized, brings back pleasant memories of lands far away.

Georgetown is by no means a featureless city, and those who assume that decaying colonies must necessarily have their representation in centres ranking equally with them in decay will regard with more than respect the stately Government Buildings, the Law Courts, the market-house, the Club, the numerous large commercial houses—where, repeating a characteristic of many business-houses the world over, everything may be had from a needle to a church-steeple—and, above all, the inviting tropical houses that lie back in cool and shaded gardens. An effective system of trolley-cars

ministers to the wants of a very large part of the 60,000 inhabitants, by far the greater number of whom are blacks, and a smaller number East Indian coolies. The whites, who constitute about three-fourths of the entire white population of the colony, number less than six thousand. Georgetown is in outer dress more attractive than either Bridgetown, in Barbados, or Port-of-Spain, Trinidad, although from the peculiarities of its geographical location it can lay no claim to scenery as part of its composition. Although my visit was timed for the months of March and April, and therefore to the period when the sun was in one of its summer positions and virtually overhead, the highest shade temperature that I saw recorded was only 87.5°, between midday and 2 o'clock in the afternoon. At this distance, therefore, of only little more than four hundred miles from the equator the extreme temperature was below that which I had observed on the Yukon River, on or near the Arctic Circle. The evenings were invariably delightful, and their refreshing quality made man a willing servant to work on the morrow.

The Exuberance of Animal Life.

In the low savannah country that for miles extends backwards from the sea-border, and frequently assumes the garb of flooded meadows in which houses appear like floating arks and where man displays his amphibious instincts in a way to remind one that roadways are not always the determinants of direction in travel, the naturalist is brought face to face with that exuberance in animal life which is the day-dream of tropical nature. Hundreds and thousands of the white ibis fleck the meadows with their slender forms. With them are spoonbills, herons, and bitterns, and myriads of the little reed-bird (*Xanthosomus icterocephalus*)—the whole a bird paradise. The graceful little spur-wing or jaçana (*Parra jaçana*) is everywhere busy in the grass-copings and sedges, apparently unmindful of the watching eyes of hawks and harriers, which appear to be in every bush and tree. They plume themselves along the driveways, or sit gravely on branch or fence-post, taking no notice of the passer-by, no more than the passer-by takes notice of them. This quality of unconcern is charming in its relation to association, and gives an opportunity to the observer to make his investigations at close range. A large-sized manatee was disporting in a pool immediately back of the railroad station at Belfield, where we were waiting for a passing train, and it, too, seemed to be wholly indifferent to the people who happened to be near-by.

The abundance in which the birds were about naturally made one eager for the chance to see the rarer types. While speeding over the savannahs my eye caught sight of three individuals of the great American adjutant or jabirú (*Mycteria Americana*), "negro-kops" as they are here styled, so peacefully meditating that one might have thought them posed by a photographer. The naked branches of the lofty ceiba or silk-cotton tree everywhere hang with the purse-nests of the *Icterinæ*, twenty to fifty, or more, in number, all gently swaying in the breeze that catches their lofty position. Some of these nests, notably of the *bunya*-birds (*Ostinops decumanus, O. viridis*) measure at times five feet or more in length, and are marvels in delicacy of construction. Storm and rain may come, but the little ones still swing in placid security in their dizzy heights above. The thinking naturalist, despite all theories of birds' nests, must continue to ponder over the evolutionary process that shaped the destinies of these remarkable constructions.

At Buxton, a small hamlet a few miles from Georgetown, where I was for some days serving a most pleasant guestship, there was nailed over the passageway between the verandah and the interior sitting-room of my host's house the skin of a large water-kamudi or anaconda. It measured 20 feet 7 inches in length, and opened out to something more than two feet. It was thus a large animal, and I naturally assumed that it was a trophy obtained from the chase in some deep interior part of the colony. But my host informed me that it met its fate as a transgressor at a distance of only 150 yards from the house, and that hardly more than a twelvemonth ago. The largest authenticated specimen of the anaconda coming from the colony appears to have measured about 29 feet in length.

On my first walk out from my host's house, a late afternoon family stroll, we chanced upon a specimen of the crab-dog (*Procyon cancrivorus*), which was being pursued in true raccoon-hunt fashion by a horde of negro boys and scatterlings. Poor creature, its broken back did not permit it to make either a vigorous defence or a graceful flight. On the morning following a living specimen of the crab-fox (*Canis cancrivorus*), its feet securely tied together, was deposited "on sale" on the porch steps. These instances of close neighbourship will show how delightfully situated the zoölogist may be who chances to visit this region. He will not lack for material, although it can well be that at times this material may be found too close at hand. Returning early of an evening from a tennis-party, driving homeward, we found the road momentarily

blocked by a not entirely ignoble specimen of alligator, whose domain extended to the waters of a bordering canal. It was one of numerous denizens of the water-ways of the region; but of such the inhabitants take little count, and allow them to work out their own salvation. The alligator, as distinguished from the less common cayman, rarely attains a length, as I understand, much exceeding seven or eight feet.

The Mighty Rivers.

Lest the geographer become too thoroughly impressed with the notion that the great rivers of the globe are only those that serve as trade-carriers or have played a familiar part in childhood's study of geography, it may be noted that in this distant forest-land are rolling waters that would shame the rivers of Europe—that would put to a long test even the "Father of American Waters." The great sweep of the Corentyn and Essequibo, rivers that 60 miles or more above their estuarine mouths measure from three to four miles in width, and which for yet a further hundred miles may still carry two miles, is an object-lesson in geography which impresses with more than ordinary force. Let the traveller stand at Bartica on the Essequibo, where the waters of the Mazaruni and Cuyuni are mingled in with those of his own stream, and he will no longer wonder why this region is sometimes called in one of its Indian tongues "the land of many waters." From far off, like unto the picture which the master of "Thanatopsis" has given of the Oregon, roll in the waters of these mighty tributaries, threading the mazes of the dark forest that falls to their banks, and leaping in silver sheets of foam through the scarred rocks that here and there interpose as cataract-walls. Nearly all of the major streams of British Guiana are now freely and regularly navigated by small steamboats and launches, but obstructing cataracts do not in most cases permit of continuous navigation for more than 70-125 miles. Above the reach of tumbling waters, nearly all of which are passed downward by paddle-craft, middle-course navigation has been established in some cases, so that without difficulty the traveller may penetrate a far way into the interior. The Corentyn, Berbice, Demerara, Essequibo (with some of its major tributaries), and Barima have all their little passenger craft, and they afford an entrancing way of studying scenery and the general characteristics of the country.

My own main journey was made by way of the Demerara River to Wismar, thence by rail across a line of inner sand-dunes—the an-

cient sea-beach, still attested by the presence of shells which are identical with those found on the ocean front—largely overgrown with the trumpet-tree (*Cecropia peltata*), to Rockstone on the Essequibo, and from Rockstone (which lies a short distance above the head of a long line of rapids) to within a few miles of the Potaro River. The Demerara, in its course of about 70 miles to Wismar, presents scenery of only a mild type, but a veritable moving picture of life. The vegetation that borders it is rankly tropical, but what there is of woodland or forest is probably wholly of second growth. Great thickets of canna, of the giant-leaved "muck-a-muck (*Montrichardia arborescens*), and cane grow out of the river's banks, and with other plants form so dense a fringe to the water that a land-surface is rarely to be seen, not even to a stray rock or pebble. The tier of thicket that rises back of the river-fringe is a vast conglomeration of green, in which the eye notes here and there clumps of eta (*Mauritia flexuosa*) and suwarri palm, of the more graceful cucurrit and manicole, the grey-barked and nearly naked-branched ceiba, with its swinging nests of cassiques, the lofty (*Mora excelsa*) purple-heart, and a mass of other trees all roped and matted together, and densely shrouded in upper growths of aroids, bromelias, and orchids. Tiny hamlets, some of them only visible in a few scattered houses, in a detached church, or in a country-store bearing the name of Chinese proprietorship, here and there peer out from the canopy of vegetation, or give evidences of existence in growths of bananas and cocoanut. But at all the "landings," which with few exceptions are made moving in mid-stream, in the manner of landings on the Rhine, you have plenty of folk—men, women, and children, mostly black or brown—come out to meet you, to gather in what is desired for debarkation at their "ports," or to take passage for some farther point on the river. At such meetings a generous flow of language usually acts as a stimulant to what intercourse is provided. The number of native boats that ply on the river is very large, and at nearly all times some of these—whether the simple dug-out or pirogue ("corial") or the banana-leaf sheltered scow and flat-boat—can be picked up along either shore. They transport fruit, dyewoods, baskets, wooden-ware and charcoal, some coming from far inland, others from the tributary waters that discharge under forest archways, so thickly screened by hanging and climbing plants as to be all but lost to the unaccustomed eye.

Throughout nearly the whole of the river-journey individuals of a species of fork-tailed swallow (*Atticora melanoleuca*) would

take refuge in a locker under the roof of the steamboat's deck. They came in twos and threes, would stop for a while and then be off again, wholly unmindful of the presence of man. Beyond these creatures there was little of animal life to be seen. Some bitterns and a few steel-blue kingfishers would at times flit across the water, and occasional stray parrots, easily recognized by the rapid, short movement of the wings and their flight in twos, might be observed gambolling among the loftier tree-crowns; but in general it was a quiet nature that prevailed, and there was little to suggest a struggle for existence.

The Forest Primeval of the Essequibo.

Just beyond Rockstone, where a line of stately eucalyptus trees leads up to a modest but well-kept hostelry or bungalow built on the edge of the woods, the Essequibo opens out into a superb expanse, with the lofty forest primeval breaking down in curtained walls quite to the river's brink. It is here, where civilization is left behind, that one learns to appreciate what wealth of tropical vegetation really signifies, and how meek and lowly, even if lovingly beautiful, is the vegetation that in the north we ordinarily conceive of as being luxuriant. Little wonder that the botanist Richard Schomburgk wrote in raptured ecstasy his description of this wonderland, that his eyes felt continuously hungry for new marvels of forest creation. Fifty years and more have elapsed since the journey of this naturalist was undertaken, but the wilds of British Guiana, save for the tiny steam craft that move up and down the rivers, puffing out their long lines of smoke, and for a few gold-holes and a few clearings made around gold-prospects, remain the same as they were in the forties—untraversed by paths, uncut, and forbidding, as they will still continue to remain for many years in the future. The sweep of water extends out from one to one and a half miles in width, here and there enclosing islands large and small, but everywhere with virtually unbroken walls of vegetation to mark its limiting borders. There are no longer hamlets or houses, no more clearings or cultivated patches; hardly a boat glides upon the placid surface of the dark waters. The majesty of nature is held up in its half-silent wilderness, in the sea of green that in towering masses teaches a lesson of humility—that tells the inconsequence of man. For a journey of upwards of seventy miles we saw no break in the forest, save where tributary waters come to join the parent stream, parting the wilds now on one side, then on the other.

He is, indeed, a fortunate traveller who can make clear to him-

Phot. A. Heilprin. FIG. 1.—THE PRIMEVAL FOREST OF THE ESSEQUIBO RIVER.

self the components of this forest vegetation. We recognize the uplifted crowns of the mora, of the purple-heart and greenheart, here and there the feathery tufts of different palms, occasional fronds of giant tree-ferns, or the buttressed trunks of the ceiba; but what are these to the vast assemblage of forms that are a secret to all but the professional botanist or that have yet to receive a name? The eye follows wonderingly the long lines of swinging and festooned lianas or bush-ropes, searches the rugged and scarring growths of air-plants that shroud the upper tree-trunks, and then falls upon that wonderful outer tunic, the curtain of creepers, that overgrows all, and, hanging terrace-like from crown to root, keeps to itself the mystery of the interior.

The wall of vegetation maintains a generally uniform height of 125 to 150 feet, with projecting crowns occasionally rising 20-30 feet higher. It is this great height, so difficult at first to realize, which makes the solemn grandeur of the equatorial woodland. The eye fatigues in following the tree-trunks to their lofty terminations, and where it has been finally set at rest it only half sees through the intricacies of foliage that bound its path. The forest, although very densely matted on the absolute water-margin—so much so as to make a footing almost impossible in many parts—is not strictly impenetrable even in the ordinary descriptive sense; for, once away from the water, the barrier of creepers largely disappears, and the undergrowth progressively thins out. But it is only at rare intervals that the machete or cutlass can be dispensed with.

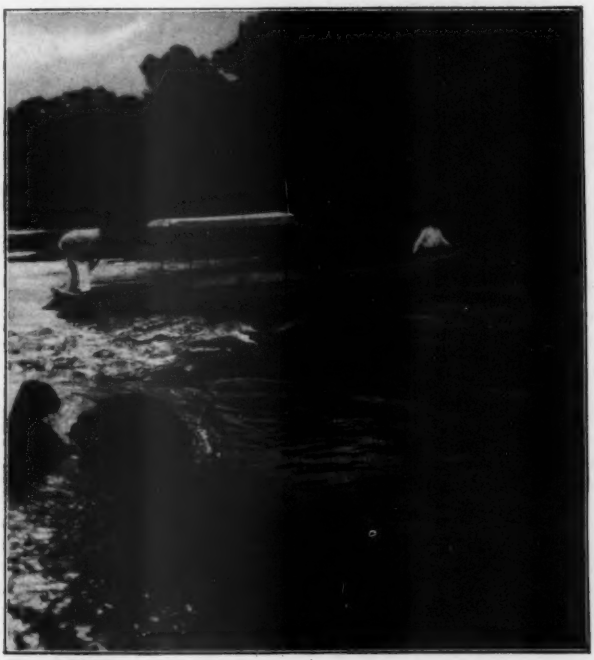
Although the general colour effect of the outer wall of the forest is that of an intense green, there are, nevertheless, many interchanges of brown, russet, and silvery grey—the expression of seasonal change, more or less corresponding to the autumnal changes in our own vegetation, in the foliage of certain groups of plants, I believe for the most part *Leguminosae;* but there were few trees or bushes that were destitute of leaf-covering—a marked contrast to the "winter" vegetation which I had before observed on the plains of Yucatan, or to that which I found in the middle of April on the slopes of the outer Andes between La Guaira and Caracas. I was surprised to find here and elsewhere in the forest so few fallen monarchs and generally decaying timbers—a striking contrast to the picture of our own north woods. What became of the trees that had passed their years was not always apparent, but the silent, destructive work of the little termite tells at least a

part of the story. They grind down to powder, and stand as messengers to assimilate the living with the dead.

The average student or reader is apt to picture the tropical wilderness with an aspect wholly different from that of the forest of deciduous trees of the North. Strange forms in foliage are calculated to impress the mind in a particular way, and to give a distinctness to contour which is largely or wholly wanting elsewhere. And, were it possible to unite into one picture the varying and more distinctive patterns which the different groups of plants exhibit, the composite would be truly a picture such as one generally sees in sketches of tropical scenery. Truthfully, too, one may say that such pictures in Nature do exist, as, for example, in the deep valleys of the islands of Dominica or Martinique, where the cannas, the heliconias, the tree-ferns, bamboos, and palms are not only distinctive physiognomic types, but occur in such numbers and in such positions as to make the landscape conformably physiognomic. This is not the case with the forest of Guiana, where the types of vegetation that might be thought to be physiognomic in the broad characters which they present are so far overshadowed by the types that are not particularly distinctive that they lose themselves as determined or dominating figures in the landscape. The palm, for example, which perhaps most people would assume to be the one great distinctive feature of the vegetation of the tropics, is here completely lost, for its tufted crown does not generally rise to more than one-half the height of the great wall of the forest, and even in clumps it is frequently difficult to distinguish. The major part of the woodland, when not too closely scanned or when studied in mass, has an astonishingly northern aspect, the aspect of the woods which are familiar to us in the types of the locust, the laurel, beech, elm, and walnut. This broad resemblance has been clearly pointed out by Im Thurn in his work "Studies among the Indians of British Guiana," and doubtless has suggested itself to many other observers. When, however, a closer study is made of the components of tropical vegetation, when integrals are examined in place of aggregated masses, the resemblances to northern types, however strong they may yet appear, give way to differences that are far more pronounced in their appeal to the eye. It is in the interior of the forest that we learn to read the architecture of the vast structure that is about us—to approach with awe the giant buttressed trunks of the mora, the ceiba, the *Eriodendron*, or *Ficus*, to gaze with wondering delight upon the wealth of vegetation that in shrouds, in festooned lines and garlands, form the upper

Phot. A. Heilprin.

FIG. 2.—FOREST OF SECOND GROWTH ALONG THE DEMERARA RIVER.



Phot. A. Heilprin.

FIG. 3.—PULLING THROUGH THE RAPIDS OF THE ESSEQUIBO.

vegetal zone. It is no longer the land of the North, but the land where summer skies are a continuous day. The impressiveness of Nature is here at one with its glories, and man stands and contemplates in silence.

It may not be easy to take the full measure of beauty of a tropical forest; nor indeed, despite its extraordinary wealth of vegetable forms, need it command a higher or more satisfying degree of admiration than the sunlit leafy woods of the North. The forest of the South, rank in growth and illuminated by hardly more than flashes of sunlight, may be thought by many to be oppressive in its grandeur; it is forbidding rather than inviting, for there are no opening glades or vistas of moss-grown retreats, no soft carpets of grass or flowering banks, no receding lines of tree-trunks, to throw dimming shadows into the interior. Everything is grand and majestic, built on a plan to be awe-inspiring rather than pleasing, to evoke admiration rather than to delight.

Mr. Wallace, in his illuminating writings upon "Tropical Nature," has laid emphasis, in a contrast between the forest of the South and that of the North—or, indeed, between the vegetation generally of the two sections of the globe—on the marked absence in the former of showy flowers, of that display which we recognize in the glory of a field of clover, or daisy and dandelion, and in the blossoming crowns of the apple, the pear, and the cherry. The traveller, he remarks, may wander for weeks among or about the wilds of the Amazonian solitudes without once having his attention attracted by showy flowers. The wilderness is green, severe, and unrelieved by colour. One cannot absolutely accept this picture, albeit it is framed by one whose years of observation in the equatorial regions entitle him to a degree of consideration which falls to the work of but few naturalists. Mr. Im Thurn, in the work already referred to, has taken distinct exception to Mr. Wallace's characterization, in so far as it relates to the water-front of the Guiana forest. A display of flowers is here by no means exceptional, and I question if there are many areas of northern woodland which have more, or even as much, to show. One cannot readily forget the patches of blue and purple *Passifloraceæ* which cover in sheets the outer tunic of the forest, the blazes of white and yellow acacias, or the intensely scarlet wheels of the *Rhexia*. These may not be more beautiful or attractive than the exquisite flowers of the rhododendron, the mountain-laurel or dog-wood, but are they much less? The northern woods, in fact, are not in themselves ordinarily prolific in a display of flowers. It is in the open fields and waste-

lands that we find that floral aggregation for which, I believe, one searches in vain in the tropics.

The Life in the Wilderness.

It is, perhaps, a commonplace observation that life is prolific in the southern "bush." Yet, be it so or not, there are some who choose to believe that these wilds are impressive in their silence, by that hushed nature which is a part of the Polar tract. The deep forest interior may in places wear this character of desertion and loneliness, but elsewhere it plays true to the world which inhabits it, and resounds in joyous sounds and uproarious tumult. Let the stranger place himself on the borders of the forest at almost any point of the river and he may be certain sooner or later to become party to a woodland chorus for which he will have been but ill prepared. It is the voice of the red-howling monkey that he hears—perhaps that of a single individual, or it may be of a whole troop; but either way it is a voice of no gentle cadence—a roar that yields in little to that of the lion. The forest is seemingly in tumult, ringing with a desolating cry; but presently one hears only echoes, and for a while everything may be quiet. It was my ill-fortune not to see any of these monkeys, or, for that matter, any other form of monkey; although fairly abundant, and seemingly always prepared to lend their voices to the night, they managed to keep out of my way and sight. I am told, on what seems to be reliable authority, that on perfectly still nights the fracas caused by a single individual howler may at times be clearly heard at a distance of three or four miles, or even more.

Alexander von Humboldt, in his essay on the "Nocturnal Life of Animals," refers to the fitful roar of the American lion. I did not at any time hear this sound in the southern wilds, although acquainted with it in the North, nor did I once come upon the tracks of the animal. On our launch journey up the Essequibo we had occasion to notice a beautiful specimen of the black jaguar, or Maipuri tiger as it is here called, which was leisurely pacing a sand-pit that the river had thrown up. The animal had come out of the forest, and may have been following a trail of capybaras (*Water-haas*), several individuals of which had but a few moments before come down to the water's edge. This rodent seems to be the favourite food of the "tiger" in these parts. A large spotted cat, reported to be a jaguar but which may have been an ocelot, visited a mining clearing (where I was staying as a guest), back of the Omai, a few days later, but beyond causing a momentary

Phot. A. Heilprin.

FIG. 4.—ON THE LOWER DEMERARA RIVER.

Phot. A. Heilprin.

FIG. 5.—AÏ, OR THREE-TOED SLOTH, CLIMBING A LARGE FORESTER.

fright to a few negroes did no damage. The stock had been well guarded. My limited days in the woods did not permit me to become acquainted with more than a few of the animal forms that are represented to be most common in the region about. One of these was an individual of the three-toed sloth or aï (*Bradypus tridactylus*), which had wandered too close to a camp of dredge-builders, and was captured. It was most interesting to watch the antics of this animal. With a face more suggestive of an idiot than of anything else, and the bristling, shaggy coat wrapped about its awkwardly-moving limbs, it presented an aspect so singularly at variance with that of other mammals that one may easily pardon Waterton for having placed the figure of one on his frontispiece bearing the legend "A Nondescript." The animal made various efforts to secure his liberty by climbing up posts and tree-trunks, but he was taken away to be cared for in a neighbouring shack. His attempt to grapple a tree-trunk the dimensions of which were much too large for his enveloping arms was ludicrous in the extreme. As in other parts of the South American wilds, the leaves of the trumpet-tree or Cecropia constitute the sloth's principal food.

While the great forests of the North are largely deficient in bird-song, so much so that bird-life might be almost thought to be absent from them, this is in no wise true of the Guiana forest. The garrulous notes of the parrots and parroquets, the yelping calls of the toucan and aracari, sound from a far way in the lofty tree-tops, so far removed that one fails to recognize the brilliant colours with which these birds are adorned. Of exquisite tone are the resonant notes of the pee-pī-yó (*Lathria cineracea*), one of the numerous family of chatterers (*Ampelidae*). I do not recall a bird-note in any way comparable to that of this remarkable songster. Others are more musical, softer in cadence and melody, more brilliant in scale; but none has that emphasis of sound-volume, that metallic "parting of the ways," which distinguishes the pee-pī-yó. It is the most general note of the forest, just as the "*Qu'-est-ce-que-dit?*" is the dominant note of the gardens and streets of the city. I was not fortunate enough to catch up the bell-notes of the white araponga or bell-bird (*Chasmorhynchus carunculatus* or *niveus*), which is said to be a common form in these wilds.

Somewhat toward the evening hour, but at times heard throughout the day, the extraordinary, metallic whirr of the six-o'clock-bee or razor-grinder cannot escape one. The insect flits from bush to bush and seemingly a machine-shop goes along.

It is a noteworthy fact that the insect pests are not noticeably

numerous in these forests—at least, they were not so in the parts that I visited. Recalling the account given by Humboldt of the torments that were inflicted by the myriads of mosquitoes along the Cassiquiare River, one could well be pardoned for fully preparing against like torments in the valleys of the Guiana rivers. But the mosquito was found to be almost wholly absent from both the Demerara and Essequibo rivers, and the minor insect plagues were about equally deficient, or, at least, not active. Presumably the large volume of swiftly-flowing waters was not favourable to the development of these plague-breeders, and the traveller was given to enjoy the beauties of Nature unmolested and unsought for blood-tribute. Even the great wasp or marabunta, whose home is more in the city than in the forest, gave no opportunity for complaint.

One of the most interesting facts connected with animal life that was called to my attention concerned a small bat, probably the *Desmodus rufus,* whose blood-sucking habits made caution necessary to both man and beast. I first came across this bat, which barely exceeded in size our own common *Vesperugo,* in the Demerara Exploration Company's clearing, about two miles from Omai Landing, on the Essequibo River. It was there a nightly and almost constant visitor to the mule paddock, and, when the opportunity permitted, it did not hesitate to attack the withers of the animals kept there, and draw their blood freely. So persistent were these attacks that it was found necessary, as a preventive to them, to have the paddock illumined throughout the night with electric lights, the bright glare from which was seemingly taken unkindly by the little vampires. The quantity of blood actually drained by the bats themselves is small, but when the work of bleeding has been finished there is a free flow, the nature of the wound being such as to remain open for a long time. It seems to be a fact that the animals attacked are not for a long time made conscious of the assault, but in how far this unconsciousness is due to a pleasant, cooling sensation which it is thought the bat imparts to his victim through the movement of his membranes I am unable to say. Chickens and fowl of all kinds are liable to attacks similar to those which involve the larger stock, and man himself is by no means spared. A coloured boy who was working in the Omai clearing had been bitten in the large toe of one of his feet two or three days before my arrival, and he was still limping when I made an examination of his foot. He only knew of the incident on awaken-

Phot. A. Heilprin.

FIG. 6.—ERECTING A GOLD-DREDGE NEAR OMAI LANDING.

Phot. A. Heilprin.

FIG. 7.—A FOREST EXILE (PURPLEHEART).—185 FEET IN HEIGHT.

ing from sleep and discovering a big clot of blood in the hammock which he occupied.

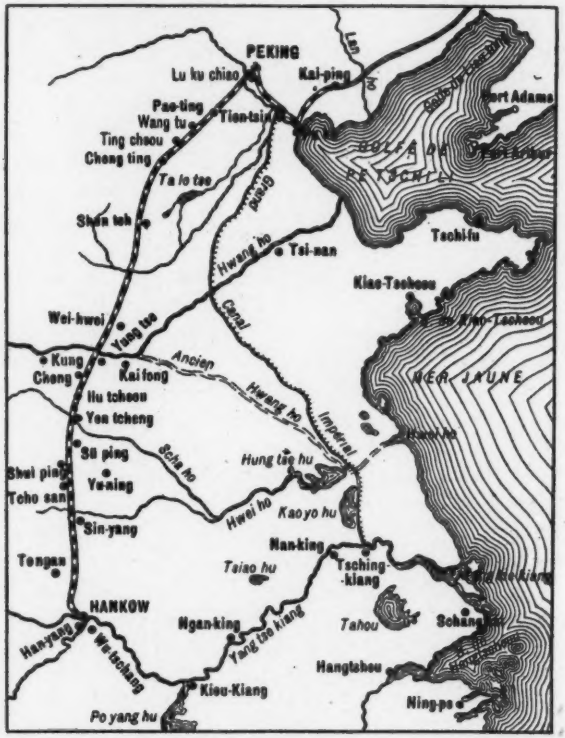
The Exploitation of the Interior.

With no interior roadways, its vast and virtually trackless forests, and the obstructing rapids that break the navigation of its waters, it is in the colony not considered a matter for surprise that it should be slow to open up its resources to the world, or that the inhabitants should barely know what these resources are. The almost boundless resource of timber, in both hard and dye woods, has thus far hardly been touched for export. Lumber concessions, under a wise forestry supervision, there are here and there, but little of the material felled finds its way beyond the limits of the colony. The most important specific grants are for *balata,* or rubber, forests of which extend across from the Barima to the Mazaruni; but little has been realized thus far from the grants. In its mineral aspects the colony shows a somewhat better record, but yet far from one that need offer a type to other countries. Ever since the days when Raleigh set out in search of the fabled El Dorado the quest for gold has been an occupation in Guiana, and what little this quest has yielded has been more than sufficient to demonstrate that gold mining may before a distant future become an important industry. Nearly all the gold is obtained from placer deposits, gravels, and clays, or from a complex rock of a granitic or diabasic character which liberates its product on decomposition. Until recently the work of mining was conducted on a rudimentary or losing system, but latterly considerable profits have been taken out from a few of the holdings where modern machinery has been introduced. Large pumping-engines, dredges, and stamps have already found their way into a few spots in the interior, and before long, doubtless, other locations will be similarly provided. Diamonds of an unusually clear water have been obtained from a few localities, but as yet little is known regarding their occurrence. Other valuable minerals, except the commoner kinds, have not heretofore been discovered. It is, however, only the exploration of the future which can give to us their full value.

Highways can and will be built into the interior, the rivers will be opened fully for navigation, and then the naturalist's paradise will gradually be converted into the prosaic commercial *Hinterland.* Until that time we may continue to wonder how it came to pass that a region so easily accessible, so prodigal in the fruits of Nature, should have so largely escaped the attention of the working naturalist.

THE PEKING-HANKOW RAILWAY.

Mr. Jean Jadot, who had charge of the construction of the Peking-Hankow Railway, which is now being extended by the Chinese Government to Canton, has recently returned to Brussels. *Le Mouvement Géographique* (No. 28, 1906) describes the farewell honours paid by Chinese officials to Mr. Jadot on his departure, and



prints a concise record of the enterprise, which is interesting as a part of the history of what will probably be the first great trunk line through China. The facts given here are from this article, and the map that accompanies it is also reproduced.

The line from Peking to Hankow is 753 miles long between the terminal points, with short branches to mines, adding about sixty

miles to the length of the track. It traverses, from north to south, the provinces of Pechili, Honan, and Hupé, which are among the most populous of China. The construction of the road was begun at both ends of the line at the end of 1898 and the opening of 1899. The northern section of the work had been extended for a distance of 114 miles south of Peking when it was interrupted in May, 1900, by the Boxer revolt. A large part of the completed portion of the railway was destroyed, a considerable number of the employees were killed, and the final completion of the road was undoubtedly set back at least a year by the insurrection.

Early in 1901 order was sufficiently restored, through the military occupation of Peking by the Powers, to warrant the resumption of work. There was no further interruption of the enterprise, and it was steadily—though, according to Western ideas, not very rapidly—pushed until its completion towards the end of 1905. It was officially opened on November 12 of that year.

A little more than half of the road was built by the northern working force, which met the southern party a little to the south of the Hoang River.

The railway was built by the "Société d'étude de chemins de fer en Chine," composed of a group of French and Belgian banks and some of the leading construction companies of the two countries. This company carried out the work under a revised concession granted by the Chinese Government in June, 1898, under which the capital of the company, $250,000, was augmented by the floating of bonds to the amount of $22,500,000, guaranteed by the Chinese Government and by the earnings of the railroad, the debt to be paid in twenty years after 1909.

Most of the material, fixed and rolling, was imported from Belgium and France. China having little timber, even the railway ties were imported, 130,000 of them coming from France, 50,000 from the Baltic countries, a small quantity from Oregon, and the remainder from Japan. The steel works of Hanyang, near Hankow, supplied about 75,000 tons of rails. A supplementary issue of bonds to the amount of $2,500,000, under the same conditions as the first loan, was floated in 1905 to meet the final expenses of the construction and rolling stock.

At the close of last year there were in the service 101 locomotives, 145 passenger cars (first, second, and third class), and 2,200 freight cars of from 15 to 40 tons capacity. The foreign builders of the road have formed a mining company under the name of "Mines du Luhan," which holds the concession for the develop-

ment of several coal fields that will supply the railroad with an excellent quality of fuel.

Although the line extends in part through a very hilly and even mountainous country, there are only two short tunnels, both of them piercing the hills immediately to the south of the Hoang River. There are, however, about 100 steel bridges from 650 to 2,200 feet in length, besides the great bridge over the Hoang River, which is wholly constructed of metal, is nearly 9,900 feet long, and is one of the great bridges of the world.

The abstract of statistics in the Chinese "Returns of Trade" for 1905 says that the work on the prolongation of this railway from Hankow to Canton was deferred until it should be settled who was to construct it and with what funds, but was resumed in March, 1906, under Chinese auspices and with Chinese capital.

GEOGRAPHICAL RECORD.

AFRICA.

THE DUKE OF THE ABRUZZI'S ASCENTS IN THE RUWENZORI RANGE.—The newspaper press announced some time ago that the Duke of the Abruzzi, whose expedition to Mount Ruwenzori sailed from Naples on April 17, had climbed the highest summit in the range, the height of which, however, was not given. A few additional particulars since received show that at last accounts his work was progressing very favourably. On June 18, only two months and a day after his departure from Naples, he had already ascended the highest point of the range, which he found to be 5,800 meters, or 19,024 feet, above sea-level, so that it is probably the second highest summit in Africa, the Kibo peak of Kilimanjaro, with 19,712 feet, being the culminating point of the continent, and Kenia, with 18,105 feet, occupying the third place.

Petermanns Mitteilungen (No. 7, 1906) says the expedition proves how much good work may be done in a short time by a party into whose organization and equipment the question of cost has not entered. Everything that might contribute to the success of the expedition was supplied without stint. The Duke of the Abruzzi is accompanied by Captain Cagni for magnetic and meteorological observations, Dr. Cavalli for geology and botany, Professor Roccati for mineralogy and geology, Vittorio Sella for photography, and Lieut. Winspeare for topographic surveying. In addition to this scientific staff, five experienced mountain guides were taken and 450 native carriers were secured at Entebbe, on the north coast of Victoria Nyanza, to transport the supplies to the foot of the glacier on the eastern slope of Ruwenzori, where the base camp was pitched. Before he climbed the highest peak of the range the Duke ascended a number of the lesser summits. He hoped to complete a good topographical survey of this entire mountain mass before returning home.

SNOW IN THE SAHARA.—The *Bulletin* of the Comité de l'Afrique française reports in its numbers for March and May that last winter was very severe in the Sahara. The courier service was interrupted for many days after Feb. 8 on account of bad weather. Snow fell on Feb. 10 to the south and southwest of Wargla, and on Feb. 5 it snowed at El Golea from 6 A.M. to 3 P.M., and, on the sixth, all day with few interruptions. The depth of the snowfall was four to five centimeters (nearly 2 in.). The northern limit of this snowstorm was El Khoua, and it extended through the region occupied by Fort MacMahon to the Gurara group of oases, its southern limit being near Uakda. On the morning of February 6, the region around Timmimun was covered with three to four centimeters of snow. The oldest inhabitants of El Golea say they never knew snow to fall there before.

BOERS SETTLING IN THE KILIMANJARO-MERU DISTRICT.—The immigration of Boer farmers into this northern part of German East Africa is increasing. The Government requires that each family permitted to take up land must have a capital of about $2,000, so that the pioneers may begin life in this new region under fairly satisfactory conditions. The immigrants also agree that in case of native uprisings they will assist the Government to restore peace.

In January last 397 immigrants were settled on 126 farms, in the district Iraku, around Mount Meru. Southeast of Arusha, on the slope of Kilimanjaro, another settlement of 300 families is in progress. The Government, believing it is best to assure mixed settlements, reserves areas between the Boer farms, on which German farmers will be established. This policy is especially desirable because most of the Boers are chiefly cattle-raisers, while the Germans are agriculturists, and the mixture of the two elements, it is believed, will give rise to considerable industrial development.

The rapidity with which this elevated and healthful region is filling up with white settlers makes it necessary to hasten the completion of the railroad from Tanga to the neighbourhood of Mount Meru. At present the colonists are using the Uganda railroad in the British East Africa Protectorate, which largely diminishes the length of the land haul. The British hope to keep a part of this transportation trade by building a branch road from Voi station to the German boundary at Kilimanjaro.

THE SEBU RIVER, MOROCCO.—A French expedition in charge of Dr. Samné is reported by the *Annales de Géographie* (No. 81, p. 280) to have made a careful study last year of the navigability of the Sebu River in Morocco. The results were most satisfactory, for the party ascertained that flat-bottom boats will be able to ascend the Sebu for about 130 miles from its estuary, and even at the low-water stage light draft boats will be able to ascend to the neighbourhood of Fez. It is certain that this waterway, which fertilizes the lowest plain in Morocco, offers an excellent route to the interior, and that a number of towns might flourish on its banks. Dr. Samné calls attention to the opportunity to revive the port of Mehdiya, on the left bank of the estuary, which was a prosperous town from the time of the Phœnicians to the heyday of the Portuguese navigators in the sixteenth century. To-day it is merely a small village, three-fourths in ruins, and occupying the centre of a region hostile to Europeans. There is a bar at the mouth of the Sebu; but it is not an insurmountable obstacle, and it may be removed without great expense.

THE EXPEDITION OF LEO FROBENIUS IN THE KASSAI BASIN.—This ethnologist, whose researches have contributed some new ideas as to the origin of African civilizations, has recently been exploring the region of the Kassai, the second largest tributary of the Congo. The results, which he communicated by letter to the Berlin Geographical Society, are summarized in the *Annales de Géographie* (No. 81, p. 284). He was preceded in this region by the German travellers Wissmann, Wolf, Pogge, Kund, and Tappenbeck, but his work renews our knowledge of the tribes in this part of Africa, and he has also completed surveys of the hydrography, where the South African plateau meets the plain of the Congo.

Accompanied by the artist, Hans Martin Lemme, Mr. Frobenius started from Dima, a large trading-point on the Kassai, a little above the confluence of the Kuango, and first studied the tribes of the Kuilu, as far as the falls above Kiknitt. In this region he discovered an entirely unknown river, the Kantcha. Then, returning to the middle Kassai, he methodically studied the region of the great river to above Pogge Falls, and also the lower Lulua, making more or less extended sojourns at Mange, Bena Makima, Mai Munene, Chikassa, and finally reached Luluaburg. He intended to complete his journey by studies along the Lulua and Sankuru rivers.

On the Kassai he surveyed two unknown sections of the river between Pogge and Wissmann Falls. He discovered a new waterfall, much finer than Wissmann Fall. The new fall was named after his companion, Lemme Falls. Under this parallel (approximately 6° S.) the rivers have their "fall line" not less clearly marked than that bordering our Atlantic coastal plain. This fall line marks, in a striking manner, an ethnographical and geographical boundary.

To the north is the forest with scattering trees at first, soon succeeded by dense growths. Here are settled civilizations relatively old, with traces of aboriginal tribes, or, in other words, the oldest that have been found here. These tribes are the Bayansi and the Babunda. To the south large affluents course over the plateau and savanna regions, which conduce to movements of the population. From these southern plateaux numerous invasions of the more northern country have occurred, such as those of the Baluba and Babunda tribes, that founded the great empire of the Muata Yamvo, of which Livingstone told us and which Pogge described. This empire no longer exists, for it was wiped out about twenty years ago by a new tribe, the Kioko. The Bachilangue of Pogge and Wissmann are to-day dispersed, and the Kioko have invaded the low country to the north. Thus the old theory of the advance of African peoples by successive waves coming from the north and east is here contradicted by the facts.

Mr. Frobenius draws attention to the rapid destruction of the cascades by water agency. Everywhere the sandstone faces of the falls are retreating. The appearance of Wissmann Falls, for example, has entirely changed since 1886. A large new section has also formed in Pogge Falls. Mr. Frobenius considers his discoveries as to the origin of Bakuba art and the poetical folklore of the Baluba as of special importance. His work thus far is described in greater detail in the *Zeitschrift* of the Berlin Geographical Society (1905, pp. 467-471; 1906, pp. 114-118 and 426-431).

THE FUTURE OF KATANGA.—Mr. H. Buttgenbach, a mining engineer, who spent two years (1902-1904) in Katanga, the southeast province of the Congo

Free State, has returned to Europe fully convinced that the resources of this region exceed those of any other part of Central Africa. He asserts (*Bulletin* de la Soc. Belge d'Études Coloniales, No. 6, 1906) that European colonization is warranted by the climate of this high plateau. Agriculture may have enormous development on these wide, alluvial plains. Many waterfalls will afford vast water power. The wealth in copper and gold may almost be considered inexhaustible. These prime advantages are certain to make Katanga the country of the future in Central Africa. He believes Katanga to be the richest copper region in the world. Every month new discoveries are being made. Over 120 ore beds have thus far been located, and thirty of them are believed to contain at least 15,000,000 tons of copper at levels not deeper than 130 feet. At the present rate of consumption the copper in these thirty deposits would supply the world for twenty years. Large deposits of tin are found near the navigable reaches of the Lualaba, and the gold discoveries are most encouraging.

New Agreement between Great Britain and the Congo Free State.—The agreement of 1894 between these countries relating to what is known as the Lado Enclave was replaced on May 9 by a new agreement signed at London. King Leopold during his reign will continue to occupy the territory, which shall, however, be handed over to the Sudanese Government within six months of the termination of His Majesty's occupation. The Free State will not permit the construction of any work on or near the Semliki River which might diminish the volume of water entering Lake Albert. A concession will be given to an Anglo-Belgian company for the construction and working of a railway from the frontier of the Free State to the navigable channel of the Nile near Lado. This railway shall be wholly subject to the jurisdiction of the Sudanese Government after the end of King Leopold's reign. The Egyptian Government will guarantee interest of three per cent. on $40,000,000 required to build the railway. A port open to general commerce shall be established at the Nile terminus of the road. Congolese vessels shall have the right of navigating and trading on the upper Nile, subject to Sudanese laws and regulations.

Agriculture in French West Africa.—Mr. Auguste Chevalier, whose remarkable explorations in the Chad basin are well known, returned to French West Africa last year to find the best place for establishing a large botanical and agricultural station, to inspect somewhat similar establishments already existing, and to study the present trend of tropical agricultural development. This official mission occupied him for nine months. His report is not yet ready for publication, but he has printed some of his conclusions concerning the present agricultural situation in the *Renseignements coloniaux et Documents, Comité de l'Afrique fr.* (XV, Dec. 1905, pp. 485-491). Native agriculture on the Guinea coast, he says, has a hopeful future. The cultivation of the groundnut in Senegal is already a success and the increasing oil industry in Togo, Dahomey, and the Cameroons shows that the black population on this coast can be induced to work.

The great results already attained in the cultivation of cacao at St. Thomas and on the Gold Coast justify the conclusion that this industry will have enormous growth in West Africa. Fifty years ago the cacao tree was almost unknown in Africa. Its cultivation was begun at St. Thomas about 1850. At present St. Thomas and Principe islands are producing over 50,000,000 pounds

a year, valued at more than $6,000,000. The Portuguese are very proud of this brilliant history and call it the greatest material success yet realized in West Africa. It is possible that the British Gold Coast, however, will surpass the Portuguese islands. The Gold Coast is now exporting cacao, though not a cacao tree was to be found there in 1885. To-day the region is producing about 11,500,000 pounds a year, worth about $1,000,000. All the work on these Gold Coast plantations is done by natives, and they own the plantations. There is not a single European plantation devoted to this crop.

Cotton in German Africa.—The Kolonial-Wirtschaftliches Komitee has issued its seventh report on the German cotton experiments in the colonies (*Der Tropenpflanzer*, No. 6, 1906), in which it says that, although the Togo cotton crop in 1905 suffered from unusual drought, 257,500 pounds, valued at 150,000 marks, were exported. Colonial cotton can never compete in the world's markets with the present sources of supply until the hoe culture of the natives is replaced by the plough. Experiments thus far in Togo and other German colonies show that the natives under European tuition learn quickly how to handle the plough and to drive draft animals. Both horses and oxen have demonstrated their usefulness in Togo. In East Africa the harvest was delayed and the crop impaired by the native uprising, though 650 bales of 500 pounds each, worth over 200,000 marks, were finally obtained. Cattle disease has thus far prevented the successful introduction of the plough into this colony. The prospects in the Cameroons are encouraging in certain districts, and also in the northern part of German Southwest Africa. The transportation problem, however, is a serious one in all the colonies. Cotton cannot pay high freight rates, and until railroads are developed there can be no large expansion of colonial cotton-growing.

AMERICA.

Mineral Productions of New York in 1905.—The New York State Museum gives in *Bulletin* 102 a report on "The Mining and Quarry Industry of New York State" in 1905. The mineral resources of this State are the basis of rapidly-growing industries. About thirty materials are now commercially exploited, and the aggregate value of the output last year was $34,663,553. Nearly one-third in value of the whole production is building brick, which were produced last year to the amount of $10,054,597, of which about four-fifths came from the Hudson River region. The limestone, quarried both for building stone and for making Portland and natural cements, was worth $2,411,456. The iron ore product was 827,049 long tons, worth $2,192,689, the progress of this industry being one of the most notable features of the year; 8,575,649 barrels of rock and brine salt, worth $2,303,067, were produced, a considerable part of the salt being used for the manufacture of soda products. The combined value of the petroleum and natural gas was $2,173,931. The other largest products were sandstone, mineral waters, pottery, Portland cement ($2,046,864), and natural rock cement ($1,590,689).

Professor Heilprin at Mont Pelé.—Professor Angelo Heilprin, who visited Martinique in February, writes in *Science* (No. 601) that the Pelé obelisk now exists only in its basal wreck, in the jagged crest which still protrudes from the summit of the supporting dome, and in a wilderness of débris composed of

small and giant fragments. All doubts as to the character of the rock mass which built up the monolith may probably now be considered removed. The rock is a compact light gray and virtually holocrystalline hypersthene-andesite, devoid of vesicles or of any vesicular or obsidian-like structure, and having a fine-grained base. Professor Heilprin sees no reason to change his view that the monolith represented an ancient plug or core that had been lifted up in the manner of the giant granite mass of the Puy Chopine, of the Auvergne. Pelé was not in activity in the early part of this year and, to all appearances, had no participation in the events associated with the earthquakes in St. Lucia and Martinique on Feb. 16. The dome in its upper parts is still quietly disengaging vapour.

A GAZETTEER OF COLORADO.—This is the sixteenth of Mr. Gannett's useful gazetteers of the States and Territories. It contains 185 pp. and is *Bulletin* 291 of the U. S. Geological Survey publications. The Hayden Survey published a topographical and geological atlas of the State which, in later years, had potent influence in its development. The total area mapped by the present Survey is about 38,000 square miles, or considerably more than one-third of the State.

THE SALTON SINK.—The U. S. Geological Survey has issued a topographical map of the parts of California and Mexico occupied by the great depression in the Colorado Desert known as the Salton Sink. The map is called the Salton Sink Special, and it shows on a scale of about 8 miles to an inch all the principal towns, roads, canals, and drainage lines. This region has been considerably discussed in the newspapers recently, owing to the threatened formation of a large lake where there is now a thriving community.

About 8,000 people settled in that part of the basin known as the Imperial Valley are raising excellent crops of barley and alfalfa. Stock farms are numerous, and experiments in raising the date-palm are in progress. The freight shipments from Imperial, a town only four years old, rival those of Los Angeles in value, and are said to exceed those of any other town in Southern California.

The existence of this community is, however, seriously endangered by the Colorado River, which is also the source of all its prosperity, as this stream furnishes water for the irrigation system. The absence of any controlling work at the head of the main canal has resulted in diverting the river from its old channel and permitting the entire flood-flow to enter the irrigating system. This is causing great damage to the ditches and crops, and is forming a large lake, which now covers about 250 square miles, at the lowest part of the Sink. The Southern Pacific Railroad has been obliged to rebuild many miles of tracks.

A NEW MAP OF GUATEMALA.—Mr. H. Prowe writes to *Globus* (No. 19, Vol. 89) from Guatemala that the civil engineer Claudio Urrutia has made a new map of that country on a scale of 1:100,000, or 1.5 statute miles to an inch, which, though the triangulation of the republic is not yet achieved, is based in most respects upon scientifically-ascertained data. A number of the maps used in the compilation, for example, were based upon astronomically-fixed positions, the boundaries upon boundary surveys, and the compiler was also assisted by Carl Sapper's surveys in the interior of the country, the studies by American engineers for the inter-continental railroad, the hydrographic coast charts, etc. Urrutia's special contribution is his delineation of the roads, his

city plans, and the boundaries of the landed estates as on a cadastral map. With the assistance of Francisco Vela he has also inserted about 1,000 contours of elevation. The map, which has been prepared with the support of the Government, is to be reduced to a scale of 1:300,000 and published.

RAILWAYS IN COLOMBIA.—The plan for the reorganization of Colombia, devised by General Reyes, is now being carried out. It includes large railway development, and the money to build some of the railways is already assured by foreign companies which have large investments in the republic. The concessions recently granted will tend ultimately to place the capital Bogotá in rail communication with both oceans. The lines already contracted for to the west of Bogotá represent about one-fourth of the distance between the capital and the Pacific port of Buenaventura. A number of links in the line to the Atlantic are also under contract.—(Condensed from the *Bulletin* of the Inter. Bureau of the American Republics, June, 1906.)

MUSEO DE LA PLATA.—Samuel A. Lafone Quevedo has been appointed Director of this Museum to fill the vacancy caused by the retirement of Dr. F. P. Moreno. By a law recently passed the Museum has been made a Faculty of Natural Science as a constituent part of the National University of La Plata, lately created. The different sections have been grouped in schools as follows: 1°, Geological; 2°, Biological; 3°, Anthropological; 4°, Geographical; 5°, Chemical.

PROFILE ACROSS SOUTH AMERICA.—The *Boletin* of the Lima Geographical Society (Vol. 15, No. 3) prints a large section across South America from Mollendo, Peru, to Pará, on the Atlantic side. The vertical scale is largely exaggerated to emphasize the irregularities of form in the section across the Andes. The horizontal scale across the Cordilleras is also exaggerated to give room for the names of heights and depressions among the mountains. The water-parting between the Atlantic and Pacific along this section is at Aguas Calientes, 3,975 meters (13,000 feet) above sea-level and 640 kilometers (400 miles) from the Pacific.

EXECUTIVE ORDER.—The official title of the United States Board on Geographic Names is changed to "United States Geographic Board." In addition to its present duties, advisory powers are hereby granted to this Board concerning the preparation of maps compiled, or to be compiled, in the various bureaus and offices of the Government, with a special view to the avoidance of unnecessary duplications of work; and for the unification and improvement of the scales of maps, of the symbols and conventions used upon them, and of the methods of representing relief. Hereafter all such projects as are of importance shall be submitted to this Board for advice before being undertaken.

THEODORE ROOSEVELT.

The White House, August 10, 1906.

ASIA.

THE REFORM MOVEMENT IN CHINA.—Periodicals dealing with Chinese affairs are constantly publishing evidence of the progress of the reform movement. Here are a few facts taken from a recent Consular Report and from the *Mitteilungen* of the East Swiss Geog. Comm. Soc. (No. 2, 1905):

U. S. Consul Anderson writes from Amoy that the authority to confer de-

grees upon scholars has now been vested in the University at Peking and in the colleges which the Government will establish in each province. The Government in 1903 appointed a Commission of three high officials to study the whole question of education. The result of its report is that a Board of Education has been established in Peking to decide upon methods of introducing Western education and a school system of different grades. The old literary examinations have been abolished by Imperial edict.

A Commission of high officials has been sent to Europe to study the workings of constitutional government. The practice of foot-binding has been forbidden in a number of the provinces. The Chinese press is spreading new and modern ideas among the people. A daily paper has been started in Peking with the title "Women's Newspaper," which is already widely distributed. Progress and reform are the burden of every page. Here are the titles of some of the articles that appeared in this journal within a few days: "The Absurdity of Fortune Telling," "Torture to Extort Confessions must be Abolished," "Proof that the World is Round and that it Moves," "Care of Children," "Kind Treatment of Animals," "Evils of Opium Smoking," "Appeal for the Formation of an Anti-Opium League," "Love of the Fatherland." Only a few years ago the official Peking *Gazette* was the only newspaper in Chinese, but to-day newspapers for the common people are multiplying, and they bring all kinds of questions to public attention. About 3,000 miles of railroads are now in operation, and concessions have been granted for the building of some thousands of miles more.

THE BARRETT EXPEDITION TO CENTRAL ASIA.—Mr. Ellsworth Huntington returned home in May from Chinese Turkestan. Information about the earlier part of the work of Mr. L. R. Barrett and Mr. Huntington has already appeared in the BULLETIN (1906, p. 236). Mr. Huntington was a member of Mr. Barrett's expedition until September, 1905, after which he worked independently. He is now engaged in writing an account of Central Asian geography and experiences. His work concluded with an examination of the Lop Nor region. His party travelled for four days on approaching this lake over a great salt plain covered with hard deposits of salt. It is evidently the site of an old lake-bed. A journey was then made over an older lake floor, red in colour, and glistening with crystals of gypsum. The whole country was absolutely desert, and was exceedingly cold, the temperature dropping at night several degrees below zero, Fahrenheit, more than forty degrees of frost being registered. From Lop Nor the party proceeded by a new route across the Kuruk Tagh Mountains to Karashar, from which place a visit was made to the Turfan depression.

TOPOGRAPHICAL MAP OF NEPAL.—The Survey of India Report for 1903-4, which has just been issued, contains the only topographical map of Nepal yet published. It shows the conformation of the mountains in a wide section of the Himalayan system. The *Geographical Journal* (Aug., 1906) says that this map is the work of Captain Wood, who was the first English surveyor permitted to take observations in Nepal. The map sets at rest the disputes which have arisen about the position of Mount Everest, proving the peak to be far removed from others which have been confounded with it and placing them all in their true relative positions. It also indicates that the great snowy

range of the Central Himalaya (sometimes mistakenly called the Indian watershed) possesses no continuity through the width of Nepal from west to east. The group of mountains of which Everest forms the centre and the contiguous group dominated by the peak known as Gaurisankar, at any rate, form no part of it. The position of certain passes leading into Tibet north of Katmandu may now be located with a fair approximation to exactness. It is probable that Mount Everest is higher by 140 feet than the height (29,000 feet) at present assigned to it, and that we shall eventually find that Kanchinjanga and not K_2 (Godwin Austen) holds the second place.

Tibetan Carpets.—The *Indian Trade Journal,* quoting from Mr. P. Landon, says that at Little Gobshi there is the finest rug factory in Tibet. Mr. Landon found a large two-story house, with a courtyard, entirely filled with the looms of men and women workers. The patterns used are native Tibetan, and the colours are excellently blended and rich in themselves. It is difficult for Tibetan weavers to make a piece of stuff wider than about thirty inches, because their looms are of a primitive description; nor do they attempt to make a pattern larger than can be contained upon a single width. The plain orange and maroon rugs are made in narrow strips and sewn together to any desired width, but this is not done with the figured cloths. When the eye is once taught to recognise the difference the cheaper rugs (worth about 3 rupees) are easily seen to be inferior from every point of view to those which the makers will not sell for less than 25 rupees. The entire annual output of this Tibetan factory is about 500 rugs.

Surveys and Maps of the Philippines.—Mr. H. D. McCaskey, chief of the Philippine Mining Bureau, in his Report for the year ending Aug. 31, 1905, says that the present maps of the Phillippines are very inadequate. Development is embarrassed by the almost total lack of topographic data for railway, high-road, and other surveys. There are no topographic maps on which to base mineral, forestry, agricultural, and other industrial surveys of importance. At present, special topographic surveys must be made for each project carried out upon scales suited to the special work involved, and therefore not necessarily in harmony with other scales used. This work is not a total loss, but it is not in accordance with the highest cartographic or economic demands. It is a more serious matter that no primary triangulation of the islands has been made from which a skeleton frame may be constructed upon which secondary or tertiary triangulation maps and accompanying topographic data may be fitted as fast as secured. The great need is a primary geodetic triangulation, which must be made sooner or later, as a fixed basis for all future Philippine survey work. It could be made under the direction of the Bureau of the Coast and Geodetic Survey as a proper extension inland of its excellent astronomic work. The public land surveys, including surveys of mining claims, are in actual need of triangulated base maps, and without them serious trouble concerning boundaries will arise. Surveys are now being made to fill present needs by the military and civil governments over limited areas.

Difficulties of Geological Exploration in the Philippines.—The Report of the Philippine Commission for 1905 mentions some of the difficulties that have combined to check mineral exploration and development in the islands. Geological exploration and field prospecting are hindered by the obstacles imposed by the

luxuriant forest and jungle growths and the excessive thickness of soil overlying rock formations. The number of intelligent prospectors and miners is still small, the United States are at a great distance, and it is consequently difficult to secure capital, and the somewhat uncertain future of the islands also tends to cripple enterprise. The result is that large portions of the islands have not been explored by prospectors even to the present day.

GROWTH OF INDUSTRIES IN JAPANESE VILLAGES.—The *Transactions* of the Asiatic Society of Japan (Vol. 32, Part 2) says that a very notable change has come over many Japanese villages, owing to the immense increase of industries established throughout the country since the close of the war with China. This is not only the case in districts where the production and manufacture of silk have always been important. In purely agricultural districts—in Saitama Ken, for example—cotton-spinning and weaving industries have been largely developed. All over this district are small factories employing from fifteen to twenty hands at spinning or weaving coarse cotton cloth. Most of the workpeople are women.

MR. GEIL'S NEXT JOURNEY.—Mr. William E. Geil, who has recently returned from a five years' journey around the world, studying native races and observing missionary operations, will sail from the Pacific coast in December for the purpose of following the Great Wall of China to the Province of Kansu, whence he will take a northerly course across the desert of Gobi, a part of his route being over unexplored ground. In China, he will keep to the south of the Wall. He will make an instrumental survey of his route through the desert, whence he will probably go north to Siberia. He is already experienced in Chinese travel, and his last journey there was from Shanghai up the Yangtse to Yunnan-fu and Bhamo in Burma.

EUROPE.

GEOGRAPHY AT GÖTTINGEN UNIVERSITY.—It will interest many teachers of geography to read the following extract from a letter written to a friend in this city by a young American who began, with the summer semester, the geographical course at Göttingen under Professor Wagner. The student is taking all the geography given in this semester, which includes mathematical geography four hours a week; the cartographical course, Part 2 (map interpretation), 2 hours a week; geographical exercises, three times a week; geographical colloquium, with papers by the various participants and discussion, three times a week; and geography of the Mediterranean countries, twice a week. Professor Wagner conducts the entire programme excepting the lectures on Mediterranean countries, which are by Dr. Friederichsen. The writer says:

> All of the courses are full to overflowing. Professor Wagner is very popular even with non-geographers. In the geographical exercises I received the problem of drawing the cross sections of the North American continent where it is traversed by the parallels of 30°, 35°, 40°, 45°, 50° N., or, in other words, 5 profiles to the scale of 1:10,000,000, the vertical scale being exaggerated 100 times. I finished four of the profiles and they show remarkably clearly the high altitudes west of 100° W. in contrast with the cis-Mississippian country. I am also to determine, with the planimeter, the area of these cross sections, then the length of the land portions of the parallels and finally the mean altitudes of the continent. This gives you an idea of the work I am doing. I find it very interesting. In the cartographical course, we are beginning with copying to the same scale as the original. In the exercises I had a paper to write on coral islands, this subject having been chosen for me on account of my knowledge of English in view of the English writings on the subject.

CAVE EXPLORATION.—The latest issue of *Spelunca* is a double number (Nos. 42 and 43), completing the review by Mr. E. A. Martel of the caves of the world, to which No. 1 of Vol. 6 of this publication was devoted (BULLETIN, 1905, p. 671). The whole work is a summary of what has been done in cave exploration thus far in the twentieth century, the first part being reserved to the caves of France, while the concluding part deals with the caves of the rest of Europe, Africa, America, Asia, and Oceania. The whole will make a volume of 450 pp. The information is drawn from numerous sources, and the work is practically a complete bibliography and record of recent activity in this line of exploration. France has a far larger share (194 pp.) than any other country, 197 pp. being given to the rest of Europe, about 24 to Africa, 22 to America, 7 to Asia, and 5 to Australia and Oceania. Many items are merely bibliographical notices of papers that have appeared, usually in the scientific periodicals. A very large number of caves is mentioned, and the newly-discovered features are described. The results of Mr. Martel's laborious task cannot fail to be very helpful to students of this phase of physical geography.

Grottoes and caverns are used, more or less, as shelters by primitive peoples, and thus inhabited caves are, of course, most frequent in Africa. A considerable number of natives make their home in caves along the southern shore of the Strait of Gibraltar, and in some of these caves are found the polished stones and arrowheads of the Stone age. Troglodyte villages are frequent in the Tebessa territory of Algeria, one of which, at Djeurf, 250 feet above the gorge of the Wadi Hallail, is reached by steps cut in the rock. The inhabitants of the Tunisian Island of Galite are cave-dwellers, their habitations being grottoes which they have dug out of the limestone, or ancient burial caverns that they have enlarged. The subterranean villages of Matmata and of Medenine, hewn out of the rock, are in southern Tunisia. A Christian monastery, built under ground in the twelfth century, still exists at Goba, Abyssinia. The explorer Chevalier found many troglodytes to the north of Baguirmi. The enormous cavern discovered several years ago, within two hours' walk of the port of Tanga in German East Africa, contains rooms whose roofs are from 120 to 250 feet above the floor. Only a few of these vast chambers have yet been explored, for the entire cavern seems to be inhabited by millions of bats. One of these, killed with a stick, measured nearly five feet across its extended wings. The stories about the grottoes of Katanga, Congo Free State, which were said to have been dug by the natives as dwelling-places, are now declared to have no other foundation than the fact that the natives often retire to openings in the dolomitic rock which serve as places of refuge from their enemies. Many troglodytes are living in caverns in British East Africa to the north of Mount Kenia.

LA RIVISTA COLONIALE.—The Istituto Coloniale Italiano has issued the first number of a monthly with this title (May, 1906). It is a handsomely-printed magazine of 172 pp., and is the largest of the several colonial publications now appearing in Italy. The purpose of this new publication is to keep the public fully informed of colonial affairs, in the expectation that a study of colonial questions and the interests of the colonies will thus be stimulated, to the advantage of the colonies, of the motherland, and of Italian colonists who go to foreign countries. The first number contains papers on Italy since the conference at Algeciras, the organization of the agricultural-colonial service, the antiquities of Tripoli and

Cyrenaica, the colonial expansion of Italy, the United States and Italian emigration, the commerce of Eritrea and the Ethiopian markets, the finances of northern Italian Somaliland, colonial information, book reviews, etc.

INDEX TO THE GEOGRAPHICAL JOURNAL.—It will interest all geographers to know from the last annual address of the President of the Royal Geographical Society (*Geog. Jour.*, July, 1906) that a general index to the first twenty volumes of the *Geographical Journal* is about ready for publication. It will form a volume of about 600 pages in double columns. The notices of geographical literature and maps in the *Journal* are more complete than in any other publication except in the *Bibliotheca Geographica* of the Berlin Geographical Society, and the new index will be invaluable for purposes of reference to all workers in the subjects to which it relates. It is gratifying, also, to learn that the general index to the fourteen volumes of the earlier *Proceedings* of the Royal Geographical Society is also well advanced.

EROSION OF THE BRITISH COASTS.—A Royal Commission has been appointed to consider questions relating to the erosion of the British and Irish coasts. The Commission is to report as to the encroachments of the sea on various parts of the coasts, the damage which has been or is likely to be caused thereby, the measures that are desirable for the prevention of such damage, and whether further facilities are needed for the reclamation of tidal lands.

THE GERMAN STATISTICAL YEAR BOOK.—The twenty-seventh issue of the *Statistisches Jahrbuch für das Deutsche Reich,* published by the Imperial Statistical Office, is just received. As usual, this summary of about 400 pages is a fine example of classification, arrangement, and clearness. Statistics in these volumes are easy to find and inaccuracies rarely occur. For some statistical purposes the quarto volumes issued four times a year by the German Statistical Office are essential, but this annual summary, though lacking the details of the larger publication, is adequate for most purposes, and may be consulted more easily than the larger work. The issue for 1906 contains about fifty pages of comparative statistics of the world, the annual being a source to which writers on the comparative statistics of the nations often go for information. The comparative tables this year number 31, some of them covering a number of pages, and are fine examples of the tabulated statistics of the leading countries relating to their area, population, products, manufactures, transportation, communications, commerce, finances, etc.

OCEANIA.

GEOLOGY OF THE NEW HEBRIDES.—Mr. D. Mawson, Lecturer in Mineralogy at the University of Adelaide, spent six months of 1903 studying the geology of the New Hebrides, including the Banks and Torres groups to the north. On account of the extreme hostility of the natives and the prevalence in many places of malaria of an acute type, this group long remained a *terra incognita.* It was not until Missions were established in comparatively recent years that accurate knowledge of the geography and natural features was obtained. Geological knowledge of the islands was still very limited, and Mr. Mawson had before him an almost virgin field. The report he has written is published, with a number of fine photographs and a map, in the *Proceedings* of the Linnean Society of New South Wales for 1905, Part III., pp. 400-484.

Among the facts which attracted Mr. Mawson's attention were the great importance of volcanoes and volcanic material in the formation of the islands, and the arrangement of the volcanoes in definite directions. He also noted the immense size of many of the Pliocene and recent craters. He found that the chain of islands owed its existence primarily to the development during Miocene times of a fold-ridge, apparently a continuation of that which passes around the north of New Guinea through Sumatra, and on to the Himalayas. The folding period was preceded by local, shallow marine conditions, and the folding force seems to have been exerted from the direction of Fiji against the New Caledonia crystalline schists and gneisses to the west. A single ridge probably resulted, defining the western line of islands where extensive outcrops of Miocene strata are exposed.

Then a faulting of the inner wing of the fold occurred letting down the sea-floor to the east, and thus putting fairly deep water between the New Hebrides and the Fiji land surfaces. Large volcanoes were developed along this fracture, and the eruptions, beginning probably about middle Pliocene, have extended down to recent times. During all this period of volcanic activity extensive submarine tufaceous beds were accumulating above the folded Miocene series. No interbedded coral limestone is found among these tuffs. Capping these series are the raised coral reefs, elevated to heights of over 2,000 feet. The oldest of these is referred to a period not earlier than late Pliocene and probably not much later, as it has since been intruded upon by lavas from centres now extinct. If the New Hebrides ridge, at any time, formed continuous land connected with other land-masses, these conditions most likely prevailed in its early history.

The discovery that the New Hebrides are a fold-chain of Alpine age throws light upon our knowledge of South Pacific geology. It is apparent that the South Pacific island groups are lined along these great fold-chains concentric on the Australian land-mass. The fact that the land areas are not continuous is due to cross-faulting, the insufficient elevation of many ridges to rise above sea-level, and other causes.

The work of the industrious coral polyp has resulted in the development of three main types of islands: (1) In regions of continuous upheaval islands are veneered with coralliferous limestone terraces—*e. g.*, The New Hebrides; (2) islands situated on subsiding areas are typical atolls—*e. g.*, The Ellice group; (3) the third type of island is one in which coralliferous limestone is interbedded with submarine tuffs or other material, being evidence both of upheaval and subsidence. Such areas are, as a rule, larger land-masses, such as Viti Levu, and have been affected by oscillatory movements of the earth crust and by folding of the acute type defining most of the South Sea Island ridges.

POLAR.

Progress of the Anglo-American Polar Expedition.—The Bulletin (June, p. 382-84) announced the departure of the expedition led by Captain Ejnar Mikkelsen and Mr. Ernest de K. Leffingwell from Victoria, B. C., on May 20 in the schooner *Duchess of Bedford* for their field of work among the Western Parry Islands and their neighbourhood. Letters since received from Captain Mikkelsen say that the party spent a number of days on Kadiak Island, but did not see any bears during their sojourn. The course was then shaped for the Siberian coast to purchase dogs. Returning to the Alaskan coast, Port Clarence, a little south of Bering Strait, was reached about July 20. Dr. George P. Howe, the surgeon of

the expedition, here came to the conclusion that Mr. E. Ditlevsen, naturalist and artist, was physically incapacitated for further service, and it was accordingly thought necessary to send him, as well as one of the sailors, back home.

On July 22 the *Duchess of Bedford* left Port Clarence, passed through Bering Strait, and on the 24th, in spite of strong head winds, reached Cape Hope, where the party was stormbound for four days. From that time they were considerably retarded by adverse winds, fog, and the presence of much Arctic ice along the coast. Leaving Cape Hope on July 29, Capt. Mikkelsen writes:

> The wind compelled us to take a true northerly course, and we struck the ice on Aug. 1 in Lat. 70° 30′ N. We followed up the pack, and on Aug. 2 came to land at Icy Cape, and had to put in two days at that point to give the ice a chance to clear away.

The schooner reached Point Belcher on Aug. 9, but from that time to Aug. 13 there was continual gale and fog. They finally broke out of the ice at noon on the 13th, and sailed in fairly open water to Point Barrow, the most northern point of the American mainland, only to find that the passage to the east of that place was not yet open.

The opening of the season along the Arctic coast of Alaska has, in fact, been very unfavourable. The winds have been light and persistent from the north, preventing the ice from clearing off the coast. None of the whaling vessels that were frozen in, last fall, east of Point Barrow, had put in an appearance at that place when Mikkelsen reached it. When he wrote, however, the barometer indicated a southerly wind, which would probably mean the opening up of the ice and a chance to pass east and make a fair advance before the season closed about the middle of September.

These conditions appear to have been fulfilled. When Mikkelsen wrote from Point Barrow on Aug. 18 he said that no news had yet been received from Amundsen; but we know now that Amundsen has since passed Point Barrow and through Bering Strait. The unfavourable season has rendered it problematical whether the party will be able to reach the destination in Minto Inlet, on the west coast of Prince Albert Land, where it had hoped to make its winter quarters; but if not, everything possible will be done to turn the winter to good account in collecting, surveying, and obtaining soundings offshore.

OBITUARY.

We regret to record the death on the 19th of July of Don Manuel Urbina y Altamirano, Chief of the Department of Natural History in the Museo Nacional, Mexico, and formerly Director *ad interim* of the Museum.

The Geographical Society of Tōkyō sends information of the death of Viscount Moriyoshi Nagaoka, Vice-President of the Society and its principal founder.

NEW MAPS.

AFRICA.

EGYPT.—Egypt. Scale, 1:50,000, or 0.7 statute mile to an inch. Sheets: III-I S. E; I-I S. E. Survey Department, Cairo, 1906.

The second of these sheets shows the region west of the Nile between the Giza and Dahshur Pyramids, with the villages, roads, and canals.

EGYPT.—Topographical Map of Giza Province. Scale, 1:10,000, or 0.1 statute mile to an inch. Sheets: N. E. 1-2, S. E. 1-5, S. E. 1-6. Survey Department, Cairo, 1906.

ERITREA.—Carta Linguistica dell' Eritrea, Etiopia, e paesi limitrofi. Scale, approximately, 1:4,100,000, or about 65 statute miles to an inch. *Bollettino* of the Italian Geographical Society, Vol. VII, No. 7, Rome, 1906.

Messrs. Dante Odorizzi and Michele Checchi compiled this sketch map showing the distribution of the linguistic groups in Italy's African colony. The spoken languages and their distribution and the various regions and tribal divisions are indicated by different styles of type.

SAHARA.—Staub und Tier-Transporte aus der westlichen Sahara. *Geogr. Rundschau,* Vol. 28, No. 10, Vienna, 1906.

Illustrates an article by Wilhelm Krebs on the transportation by air currents of dust, birds, and insects, from the western Sahara to the islands of the west coast and the lands of western Europe. Symbols show the areas frequently covered by dust falls; also the areas over which land birds, butterflies, and dragon flies were transported by ships in the first five years of this century.

AMERICA.

U. S. GEOLOGICAL SURVEY MAPS.

ALASKA.—Reconnaissance Map of the Northern Portion of Kenai Peninsula. Scale, 1:250,000, or 3.95 statute miles to an inch. Contour interval, 200 feet. Washington, D. C., 1906.

The map illustrates Bulletin No. 277 on the mineral resources of the Kenai Peninsula. This region has a shore-line more than 1,000 miles long, and contains both gold and coal fields. The surveys on which the map is based were made in 1904, when more than 1,600 square miles were mapped topographically and all the producing gold placers of the peninsula were visited.

U. S. HYDROGRAPHIC OFFICE CHARTS.

Pilot Chart of the North Pacific Ocean, Sept., 1906.

UNITED STATES.—Geological Map of the Buffalo Triangle. Scale, 1:62,500, or 0.9 statute mile to an inch. New York State Education Department, Albany, 1906.

The map illustrates Bulletin 99 of the New York State Museum. It includes the city of Buffalo and its environs. Mr. D. Dana Luther resurveyed the area geologically, and the map presents accurate data in regard to the surface rocks

and the succession of strata in Buffalo and its neighbourhood. With its accompanying text, it is a detailed guide to the rock sections of the region and the scattered and often obscure outcrops of the formations. On the margin is a stratigraphic section along the eastern boundary of the quadrangle.

BRAZIL.—Völkerkarte des Gebiets am oberen Rio Negro und Yapura. Von Dr. Theodor Koch. Scale, 1:3,000,000, or 47.34 statute miles to an inch. *Globus,* Vol. 90, No. 1, Brunswick, 1906.

The map shows the distribution of about fifty Indian settlements among the upper waters of the Rio Negro. These settlements are divided by tints into five linguistic groups. The map accompanies a paper by Dr. Koch on his important ethnological researches in this almost unknown part of the Amazon basin.

CHILE.—Die Skyring- und Otway-Buchten an der Magalhães Strasse. Scale, 1:750,000, or 11.8 statute miles to an inch. *Pet. Mitteillungen,* Vol. 52, No. 6, Gotha, 1906.

The map is based upon the original map published by the Chilean Hydrographic Office in 1904. It shows the changes that have been made in the mapping of the western part of Magellan Strait in the present century.

PERU.—Cróquis de Conjunto de las Provincias de Jauja y Huancayo. Scale, 500,000, or 7.8 statute miles to an inch. *Boletin* del Cuerpo de Ingenieros de Minas del Perú, No. 35, Lima, 1906.

One of the numerous sketch maps that the Mining Department of Peru is issuing, their special value being that they show the distribution of all the towns, pueblos, haciendas, mines, and hydrographic features.

PERU.—La Región Cuprífera de los Alrededores de Ica y Nazca. Scale, 1:500,000, or 7.8 statute miles to an inch. *Boletin* del Cuerpo de Ingenieros de Minas del Perú, No. 29, Lima, 1905.

Shows the geological formations, mines of copper and gold, railroads, and rivers.

PERU.—Cróquis de la Provincia de Arica. Scale, 1:500,000, or 7.8 statute miles to an inch. Trazado por Carlos Larrabure y Correa. *Boletin* of the Geographical Society of Lima (Vol. 15, No. 2, 1905).

The map shows the southern limit of the territorial claims of Peru in the still unsettled boundary dispute between that country and Chile.

ASIA.

DUTCH EAST INDIES.—Schetskaart der Rokan Landschappen. Scale, 1:300,000, or 4.73 statute miles to an inch. Topographic Bureau, Batavia, *Tijdschrift* voor Indische Taal, Land-en Volkenkunde. Vol. 48, No. 5, 1906.

The results of a topographic survey of a district in east central Sumatra.

INDIA.—Geological Sketch Map of a portion of Sausar Tahsil, Chhindwára District, C. P. Scale, 1:63,360, or 1 statute mile to an inch. *Records* of the Geological Survey of India, Vol. 33, Part 4, Calcutta, 1906.

Illustrates notes on the rock formations and the manganese ore deposits of this district in the Central Provinces.

INDIA.—Geological Sketch Map of Portion of Bhutan. Scale, 8 statute miles to an inch. *Records* of the Geological Survey of India Vol. 34, Part 1, Calcutta, 1906.

Illustrates a geological reconnaissance by Mr. Guy E. Pilgrim along the border

of the sub-Himalayas in Bhutan. His observations seem to confirm the earlier view that from Nepal eastward there are more or less continuous outcrops of the clays and sandstones of the upper Siwaliks, the quartzites and graphitic schists of the Gondwana beds, and the Purána metamorphic rocks; these formations being mentioned here in the order in which one meets them going inward from the plains into the foothills.

AUSTRALASIA.

AUSTRALIA.—Carte des Missions Catholiques en Australie. Scale, 1:5,000,000, or 78.9 statute miles to an inch. *Les Missions Catholiques,* July 6, 1906, Paris.

The Roman Catholics divided the entire Australian continent into ten Archdioceses, whose boundaries are given on this map, together with the boundaries of the ordinary Dioceses and Vicarates as far as they have been organized in the more settled parts of the continent. The Mission stations are so numerous that they are indicated only by the residences of the archbishops, bishops, and vicars. The special information is imposed upon an excellent map of the continent showing the land-forms, hydrography, and cultural features.

POLYNESIA.—Verkehrskarte der nordwestlichen polynesischen Inseln. By G. Thilenius, in "Ethnographische Ergebnisse aus Melanesien." Part 1. *Abhandlungen* der Kaiserl. Leop.-Carol. Deutschen Akademie der Naturforscher. Band LXXX. No. 1.

These islands extend along the eastern border of Melanesia from New Guinea to Samoa. Black lines connect these sea routes.

EUROPE.

AUSTRIA.—Sprachenkarte von Kärnten. Scale, 1:200,000, or 3.1 statute miles to an inch. By Dr. Martin Wutte. *Deutsche Erde,* Vol. 5, No. 3, Gotha, 1906.

Based upon the census of 1900. Tints show the percentages of Germans and Slavs living in each area of Carinthia. The map illustrates an article by Dr. Wutte.

SCANDINAVIA.—Sveriges, Norges och Danmarks Järnvägar vid slutet af år 1903. Scale, 1:3,200,000, or 50 statute miles to an inch. Allmän Svensk Järnvägsstatistik för år 1903. Published by the Government, Stockholm, 1903.

The state railroads are shown in red and all others in black. The lines are also distinguished as standard or narrow gauge.

ICELAND.—Geologische Karte von Island. Scale, 1:750,000, or 11.84 statute miles to an inch. By Dr. Th. Thoroddsen. *Petermanns Mitteilungen,* Ergänzungsheft, No. 153, Justus Perthes, Gotha, 1906.

A beautiful product, illustrating the second volume of Dr. Thoroddsen's extended study of the geography and geology of Iceland. Thirteen symbols are used to show the distribution of the geological formations and glaciers and fourteen others to indicate the position of hot and mineral springs, raised beaches, volcanoes, fossil plants and shells, etc. This map is the companion piece of the Höhensschichten-Karte von Island accompanying the first part of Dr. Thoroddsen's study (Ergänzungsheft 152).

OCEANOGRAPHY.

ATLANTIC OCEAN.—Anlotung von Freetown. Annal. d. Hydrog. u. Mar. Meteorologie, No. 8, Deutsche Seewarte, Hamburg, 1906.

Illustrates an article on the oceanographical work of the German steamer

Planet in the Atlantic. Nineteen soundings were made from Freetown to a little west of 15° W. Long., where a depth of 4,743 meters was attained. A series of soundings showed the relatively steep descent of the continental shelf to deep-sea depths. A profile gives the contour of this section of the sea-floor, the vertical scale being exaggerated tenfold.

ATLANTIC OCEAN.—Lotungen S. M. S. Planet. From *Annalen* as above.

This work was west of Walfish Bay, Africa, showing that the Walfish Ridge in the Atlantic, off this Bay, is a comparatively small elevation of the sea-floor, with an average depth over it of about 2,500 meters.

GULF OF BOTHNIA.—Der Bottnische Meerbusen. Annalen d. Hydrog. u. Mar. Met., No. 8, Deutsche Seewarte, Hamburg, 1906.

Accompanies a paper by Rolf J. Witting on the Gulf of Bothnia. Five tints distinguish the contours of depths; the positions of lighthouse and lightships are shown.

ATLASES.

ATLAS OF THE WORLD'S COMMERCE.—Compiled from the latest Official Returns at the Edinburgh Geographical Institute. Edited by J. G. Bartholomew. (Part 8.) George Newnes, London, and Frederick Warne & Co., New York, 1906.

Includes a General Commercial Chart of North America, coloured to show the predominating forms of vegetation, cultivated areas, desert and tundra, transportation and telegraphs, and a diagram of the vertical distribution of vegetation; the United States, coloured to show arable and grazing lands, manufacturing districts, with letters at the manufacturing towns indicating the nature of the chief industries, and commercial diagrams; the Dominion of Canada, coloured to show regions of cultivation, intensive cultivation, and industrial districts, with export and import diagrams; a commercial Chart of South America, coloured to show distribution of vegetation, communications, and transportation; the West Indies and Central America, with chief products lettered in red and commercial diagrams. The description of the commodities of commerce is carried forward from Palma Christi to Rags.

ANDREES ALLGEMEINER HANDATLAS.—In 139 Haupt und 161 Nebenkarten, nebst vollständigem alphabetischem Namenverzeichniss von etwa 240,000 Namen. Fünfte, völlig neubearbeitete und vermehrte Auflage. (Lieferungen 37-42): Herausgegeben von A. Scobel. Velhagen & Klasing, Leipzig, 1906. (Price of complete work, M. 28.)

The new edition of this standard atlas is now three-fourths completed. The ten double sheets in these numbers include four maps showing density of population and distribution of rainfall in Europe; the northern half of England and Wales; Eastern Asia from Japan to Persia, with a clear delineation of the topography; the explored and unexplored parts of rivers are sharply defined. A double sheet of the northeastern part of Africa, containing the many changes which recent explorations have made, adds, if anything, to the high reputation this atlas has enjoyed for its Africa maps. A double sheet is given to fifteen maps of the most important Pacific Islands. The double sheet of the northern part of India is conspicuous for its plastic delineation of the Himalayas and the clear printing of names in the mountain regions. A notable feature of this edition is the large number of hydrographic soundings and the tinted contours of sea depths.

BOOK NOTICES.

Hydrographic Surveying—Methods, Tables and Forms of Notes. Samuel Hill Lea, M. Am. Soc. C. E. New York: The Engineering News Publishing Co., 1905.

This is a valuable Manual, setting forth the best modern practice in all kinds of hydrographic surveying, excepting marine hydrographic surveying in its more comprehensive forms. The book does not digress into those fields of engineering that embrace a consideration of the factors which affect the choice of sites for engineering structures, nor into the mathematical theories that underlie hydrographic surveying and the gauging of the flow of streams; it is confined to the practical needs of the surveyor who would conduct in the best manner the work that falls to his assignment.

In reaching this meritorious aim of setting forth plainly and directly what are the operations and computations comprised in hydrographic surveying and how they are carried out, the author has conferred upon students and beginners the important advantage of having at their service what would otherwise come to them only through extended experience in actual work in the field. G. W. L.

Géographie de l'Empire de Chine. (Cours Supérieur.) Par L. Richard. xviii, 564 and xxii pp. Many tables, maps, figures, and Index. Imprimerie de la Mission Catholique, Shanghai, 1905. (Price, $3.80 Mexican.)

Géographie de l'Empire de Chine. (Cours Inférieur.) Par L. Richard. xx and 272 pp. Tables, maps, figures, and Index. Imprimerie de la Mission Catholique, Shanghai, 1905. (Price, $1.80 Mexican.)

These text-books are in French, with all place-names also given in Chinese characters. The author had access to much information not readily obtained, and his books are a unique contribution to text-book literature. They are intended for Chinese students who are studying French in the mission schools of the Empire. The information is condensed, but is in astonishing variety, and is carefully compiled. The larger book especially will be valuable in any reference library, because it contains many facts not commonly known. Special attention is paid to physical geography, and the geology of various regions is also sketched. Much importance is given to commercial geography, indispensable in geographical treatises used in Chinese schools, because many of the students are the future merchants of the country. The comprehensive bibliographies in both books add much to their value, and statistics of most parts of the Empire are brought down to 1905. The maps, black-and-white and coloured, are numerous, but inferior in merit to the text, though many maps give numerous details, rather roughly presented, which we are not accustomed to see.

Die Barometrische Höhenmessung, mit neuen Tafeln, welche den Höhenunterschied ohne Zuhilfenahme von Logarithmentafeln zu berechnen gestatten. Von T. Liznar, O. Ö. Professor an der K. K. Hochschule für Bodenkultur in Wien. Leipzig und Wien: Franz Deuticke, 1904.

The author has given a thorough demonstration of the theory of the barometric measurement of heights by a method which is characterized by simplicity and brevity and which is different from the ordinary methods and partly new. Supposing the

atmosphere to be in a state of equilibrium, the investigation is founded upon the consideration of a column of air having a cross-section of one square-meter. The weight of a given volume of this air depends on the pressure, p, the temperature, t, the humidity, e, and the acceleration of gravity, g, which is a function of the height, h, and the latitude, ϕ.

The formula for computing H, the difference of altitude between two stations whose heights are h_1 and h_2 is found to be—

$$H = 18400 \left\{ 1 + \alpha \frac{t_1+t_2}{2} - \frac{\alpha^2}{12}(t_1-t_2)^2 + 0.377 \frac{4560}{H} \cdot \frac{e_1}{p_1}\left(1 - 10^{-\frac{H}{10500}}\right) + \frac{2h_1+H}{R} + 0.0026 \cos 2\phi \right\} \log \frac{p_1}{p_2},$$

in which ϕ is the coefficient of expansion of air, and R is the radius of the Earth.

Putting H^1, the approximate value of H, equal to $18400 \log \frac{p_1}{p_2}$, there results

$$H = H^1 + \alpha \frac{t_1+t_2}{2} H^1 - \frac{\alpha^2}{12}(t_1-t_2)^2 H^1 + 0.377 \frac{4560}{H} \cdot \frac{e_1}{p_1}\left(1 - 10^{-\frac{H}{10500}}\right) H^1 + \frac{2h_1+H}{R} H^1 + 0.0026 \cos 2\phi H^1$$

Therefore, in order to find H, the approximate value H^1 should have the following corrections applied to it:

(1) On account of atmospheric temperature, $C_t = \alpha \frac{t_1+t_2}{2} H^1$

(2) " " " " " , $C^1_t = \frac{\alpha^2}{12}(t_1-t_2)^2 H^1$

(3) " " " " humidity , $C_e = 0.377 \frac{4560}{H} \frac{e_1}{p_1}\left(1 - 10^{-\frac{H}{10500}}\right) H^1$

(4) " " " " gravity due to altitude, $C^h_g = \frac{2h_1+H}{R} H^1$

(5) " " " " " " " latitude, $C^\phi_g = 0.026 \cos 2\phi . H^1$

The approximate value of H^1 is obtained in the following manner:

$$h^1{}_2 = 18400 (\log 762 - \log p_2)$$
$$h^1{}_1 = 18400 (\log 762 - \log p_1)$$
$$H^1 = h^1{}_2 - h^1{}_1.$$

The corrections (1), (2), (3), (4), and (5) are conveniently tabulated by the author in such a manner as to simplify the computation of heights by obviating the necessity for the use of logarithmic tables and by giving directly in meters the corrections for temperature, humidity, and gravity. G. W. L.

La Bretagne, par Gustave Geffroy. Illustrations d'après les Photographies de M. Paul Gruyer. Hachette et Cie., Paris, 1905. 4to.

It always affords pleasure to find a book the author of which is in love with his subject; and such is the case with Mr. Geffroy. To him, Brittany is, not a paradise, but a great poem, a weird dream. Hence what he has written concerning it—a volume of nearly 450 pages, "édition de luxe," with most beautiful photolithographs—is to be judged from its literary aspect only, since the author makes no claim to scientific accuracy or to present systematic information on the geography of the country. Still, there is useful material, but dressed in a garb that would be exquisite if it were plainer, more simple. The author carries one through all Brittany, entering the peninsula from the north (the side of Normandy), and traversing it in almost every direction to its three seaboards. It is the journey of a literary tourist, prepared for his self-imposed task, as far as an eye for the striking is concerned, and sufficiently familiar with the history of the country to season his descriptions, and temper them with legends and facts from the past. The views and portraits of people and costume, due to Mr. Paul Gruyer, contribute to enhance the value of the work.

The enthusiasm of the author for the land of Brittany is justifiable. Few parts of France contain so much of interest in the works of man, archaic, mediæval; in every branch of art, be it sculpture, painting, architecture, or other. But the *quaint* predominates; the comparative geographic isolation of Brittany and its seclusion have had their influence on the culture of the people. The landscape is not uniformly prepossessing, nor is the land uniformly productive. The people have preserved a wealth of customs of old, as well as their local costume. They are doubly interesting on that score, and Mr. Geffroy makes the utmost of it, in word as well as in picture. His judgment about the great men of Brittany is, although influenced, of course, by the "immortal principles of 1789," not offensively flippant; while (after the present fashion in France) he treats religious faith and creed as a thing of the past, and bound to disappear as soon as people "learn to read and write," he still refrains from attempting to ridicule ceremonies in which the people sincerely believe. His judgment of Chateaubriand is pleasing to read. It is not a panegyric, but a fair acknowledgment, with sufficient allusions to that great writer's failings.

What detracts considerably from the merits of the work is its manner of treatment. Every village, every town or city, is rehearsed in the same fashion. First the history is rapidly sketched, then the artistic detail and the architectural description; always in the same order. This, in the compass of over four hundred pages, becomes very monotonous. Still more so is the author's habit of constantly using, not only comparatives, but superlatives. Even domestic animals do not escape his predilection for a sort of poesy in swelling prose. Not a page is free from this fault.

Of natural history Mr. Geffroy has no idea, so far as Brittany is concerned; and he seems to know only the names of the animals he mentions. A. F. B.

Relación de los Naufragios y Comentarios de Alvar Nuñez Cabeza de Vaca, Adelantado y Gobernador del Rio de la Plata. Ilustrados con varios documentos inéditos. Tomos 1 and 2. (Colección de Libros y Documentos Referentes á la Historia de América. Tomos V and VI.) Madrid, Victoriano Suárez, 1906.

It cannot be said that these two octavo volumes are uncalled for. They present the advantage, to the student whose means are limited, of giving the text of original prints that are very rare, and of reproducing that text in a type which is much more readable than, for instance, the version of Enrique de Vedia in his "*Historiadores*

de Indias." The Editor might, however, be censured for giving only the text of the 1555 edition of the *Naufragios*, whereas it would have been infinitely more valuable had he copied and properly annotated that of 1542, published at Zamora. But against such an eventual reproach we must defend him. He knew of the existence of that *editio princeps;* but there are, as far as known, only two copies of it in existence. One of these, in a perfect state, is at the Lenox Foundation of the New York Public Library; the other, an imperfect copy (in which the pages lacking have been supplied by photolithographic reproductions), is in the British Museum. Such extreme rarities are not easily accessible from a great distance. The text of 1542 differs from that of 1555 in some respects, and these discrepancies are not as immaterial as the Editor of the two volumes before us fancies them to be. Neither is his rendering of the version of 1555 always exact. He has, with very laudable intent, endeavoured, in some instances, to elucidate the often confused original text—a thing that should never be done unless in footnotes or in an introduction.

The Editor's comments on the two books written by Cabeza de Vaca are, fortunately, limited. To state that the customs of the Pueblo Indians of New Mexico were nearly the same as those of the shifting tribes of Texas, and to quote the manuscript of Villagutierre y Sotomayor: "*Historia de la conquista, perdida y restauracion de la Nueva Mexico*" as a source of primary importance shows, first, that the Editor has a most insufficient knowledge of the bibliography on the subject; secondly, that he has not the least shadow of an idea about the regions traversed and the aborigines met in the sixteenth century. The same applies to his appreciation of the cures effected by Cabeza de Vaca and his companions, after they had been compelled to become "medicine-men" for the Indians. With the insignificant basis on which he rests his judgment it would have been far better, for his own sake, had he desisted from expressing any. His comments on the career of Cabeza de Vaca in Paraguay are less objectionable, because they are shorter. He defends Cabeza de Vaca from the unjust slurs cast upon him by Azara, to a certain extent, and makes the true remark that he "used to sin more from want of energy than through acts of violence."

In the first volume the edition of 1555 is recorded as the first, while in a footnote to the "Advertencia" to the second volume the Zamora print of 1542 is mentioned as the first. The well-known report of Hernando de Ribera of 1545 follows at the end of Cabeza de Vaca's "Comentarios." A. F. B.

Jahrbuch des Schweizer-Alpenclub. Jahrgang XL, 1904–1905. Bern: A. Francke (vormals Schmid & Francke), 1905.

Statistics of accidents in the Alps, during the year 1904, sum up 49 cases, with 58 deaths. This is a slight increase over 1903, and is accounted for by a more favourable season and a corresponding increase of tourists. Three of the accidents occurred in winter, sixteen took place in the highest regions, and thirty-three in the subalpine. Only two guides lost their lives; fourteen tourists were killed while venturing alone into the range of lofty summits and glaciers far above the line of perpetual snow, and hence were victims of their own temerity. The other deaths were due to natural phenomena (avalanches, fog, and the like), to loss of foothold, exhaustion, etc.

In connection with such statistics the first section of the year-book becomes of special interest. The excursions and ascents therein described were of peaks least frequented, over crests and passes of most dangerous character. It is perhaps questionable whether the risks are in proportion to the results, whether it is worth while

for valuable lives to run the gauntlet of destruction so often and so rashly. Especially in a country so thoroughly "ascended" as Switzerland!! It becomes also tiresome to follow the rhetoric of a devoted acrobat over hill and vale, glaciers to kill, up "chimneys," along dizzy "bands," finally up something akin to Cleopatra's Needle to a bare point of rock, whence he surveys the identical panorama of "peaks, passes, and glaciers" enjoyed all around; only from a different angle. Some of the articles are of value, like that of the remarkable tour from Meyringen (Berne) to Chamouni in Savoy, climbing and vaulting nearly every tall peak that lies in the way, avoiding carefully what is easy and safe; and the "rambles of a guideless photographer." The chief results of these perilous adventures are the magnificent photographs published in this volume. They are, to the still-life of the Alps, what successful views of dense forests would be to the exuberance of the tropics. The detailed structure of imposing solitudes of rock, snow, and ice is represented with unsurpassable minuteness, and with a degree of artistic sense, that cannot be too highly commended. At the end of the first section is a valuable paper by Dr. Andreas Fischer (Basle), headed "In the Caucasus," and describing his ascents and explorations in the Abkhasian Alps; accompanied by a sketch-map of the mountain triangle within the courses of the Tschkalta, Kodor, and Gonatschkir Rivers. The highest points reached seem to have been: in the Abkhasian group the Dombai (4,051 meters = 13,287 feet), and later on the gigantic Elbruz (5,629 meters = 18,463 feet). Not content with that very respectable feat, Dr. Fischer and his companion, Mr. Alexander von Meck, President of the Russian Alpine Club, also ascended the Kuru Tau (4,091 meters). A map of the Elbruz group is given from Russian charts on the scale of 1:210,000. The photographs accompanying the paper are worthy of the book in which they are published. Dr. Fischer calls his paper a mere sketch; still he finds space to refer frequently to the remarkable beauty of the region, the grandeur of the mountains, their picturesque forms (well given in the photographs), and the magnificent vegetation sweeping up to the very glaciers. Had the Caucasus the placid lakes for which Switzerland is so justly celebrated, it would, in its actual state of undefiled nature, probably be superior to anything the Alps can offer. No wonder that such scenery, merely indicated by Dr. Fischer, inspired in the late Gerhard Radde the inimitable beauty of his descriptive style.

The second part of the year-book, embodying specially scientific papers, begins with one on the periodic variations of the Swiss glaciers. It results, from observations made on many glaciers from 1897 to 1904 inclusive, that retrocession is very marked. But the same table also seems to indicate that the retrocession attained its maximum in 1900 and 1901, increasing annually up to that time and decreasing correspondingly afterwards. Still, the authors of the dissertation show that the snow-falls in the high Alpine region (hence local meteorologic phenomena) may become a factor not to be neglected. It is to be noted that glacial retrocession in the Andes of Peru and Bolivia has been very strongly marked since 1894. The short article on photographing in the Alps might well have been omitted; especially the two vignettes in the beginning and at the end, showing the author in attitudes recalling the German rhyme: "Mit Stiefel und mit Sporn, von hinten und von vorn."

The extensive discussion, by A. Wäber, of "Names of the Valais Mountains and Passes in the XIX Century" furnishes a voluminous bibliography of the Swiss Alps, beginning with Bonstetten's *Superioris Germaniæ Confederationis Descriptio* (1479–80) and is brought down to about 1801. There is considerable obscurity yet in regard to most names, and the remarkable collection of documents relating to the Canton of Valais published by the Abbé Grémaud, which embodies documents from 300 A.D. to

1457, only mentions the Balmhorn. Of passes, the St. Bernard and the Simplon appear first under recognizable appellatives in the *Claudii Ptolomæi Cosmographia* of Donis in 1482 (Nicolaus Germanus). On the map of 1548 by Johannes Stumpf, Zermatt is recognizable, and the Mons Martis may stand for the group of peaks culminating in Monte Rosa, although Mr. Wäber identifies it with Monte Moro. But it is likely that not single summits, but groups (massifs), were meant by such names as Antrun Mons, Mons Martis, Mons Sylvius; the last referring to the region of the Matterhorn (Matterjoch). The author insists, perhaps too strongly, on the fact that passes appeared earlier in orographic nomenclature of Switzerland than summits. That the Mons Martis is intended for the Monte Rosa cluster is shown by the course of streams on the 1548 map. That the word "rosa" should mean a glacier, in the dialect of the Val d'Aosta, furnishes a more plausible and likely ethnology of the second highest mountain in Europe than the explanations generally admitted. The Valais was much less known than, for instance, the Bernese Oberland, where the Eiger (Mons Egere) and the Eiger-Rotstock (Truncus rubeus) are mentioned, in documents, already in 1252.

Among the remaining contents of this interesting year-book may be mentioned the long list of explorations during a part of 1903 and 1904, the crossing from Lenk to Leuk (les-Bains) by Küttner in 1780, and several of the reviews. One of these calls attention to the importance of Coolidge's book on Josias Simler and the origins of Alpinism as far as 1600 (Grenoble 1904). A. F. B.

Du Transvaal à Lourenço Marques. Lettres de Mme. Ruth Berthoud-Junod. Publiées par Gaston de la Rive et Arthur Grandjean. 308 pp. Map, 28 Illustrations, and Appendix. George Bridel & Co., Lausanne, 1904. (Price, 3 fr.)

The author was a missionary's wife who, with her husband, made an overland journey, by ox team, from the Transvaal to Lourenço Marques, where they established a mission. Their success in the mission field was gratifying. Mme. Berthoud-Junod died in 1901 after nearly twelve years in Africa. Her letters are no commonplace description of missionary experiences. With a vivid pen the author sketched travel in Africa, the natives, and missionary work. She had an eye for the picturesque and the uncommon. She was writing to friends and not for the public, which may explain in part her naturalness and the ease and grace of her descriptions. The letters are worthy of preservation in book form.

Bilder aus Südasien. Von Pauline Gräfin Montgelas. 146 pp. 6 Illustrations, and a Sketch Map. Theodor Ackermann, Munich, 1906.

A very readable account of the travels of the Countess de Montgelas in her extensive journey through Cochin-China, Cambodia, Siam, Java, Burma, and India. It is not frothy nor diffuse, but the writer describes succinctly what she saw that she regarded as most worthy of comment.

L'Ubaye et Le Haut-Verdon. Essai Géographique par F. Arnaud. 216 pp., and Maps. Published by the author, Barcelonnette, 1906.

Mr. Arnaud says that Alpinists and tourists who use the French Staff map on the scale of 1:80,000 find that much information of importance to tourists is lacking on the sheets. Among the mountains of southern France, for example, there are areas of ten square kilometers in which there is not a single name.

The book was prepared to correct errors on the Staff map and supply information which the sheets lack. The criticisms and information are confined to the sheets of Ubaye and Haut-Verdon. The author makes 106 corrections in the 735 place-names on the map and adds the names of 1960 new places, streams, hills, etc.

Geography of New Zealand. By J. R. MacDonald. vi and 118 pp. 29 Maps, and 16 Illustrations. Gordon & Gotch, Lim't'd, Wellington, 1903.

A small book intended for pupils in the higher geographical classes. It is full of information, the more important matter being in large type, with details in smaller type under it. Special attention is given to topography, commerce, communications, and places of interest for tourists, which is doubtless the reason why the Department of Tourists and Health Resorts of New Zealand is calling attention to the book.

Om Eskimokulturens Oprindelse. Af H. P. Steensby. 219 pp., and Bibliography. Salmonsen Bros., Copenhagen, 1905.

An ethnographical and anthropo-geographical study of the Eskimos, in which the author discusses the various theories as to their origin, describes Eskimo types as they have been studied in their habitats, and compares the Eskimos with Indian tribes of the northern part of this continent.

Instrumentenkunde für Forschungs-Reisende. Von C. Seidel und W. Müller. viii and 200 pp. Illustrations. Dr. Max Janecke, Hannover, 1906. (Price, M. 4.40.)

A copiously-illustrated list of the various instruments used in field work by explorers, with information as to the purposes they serve and how to use them. Manufacturers and prices are mentioned.

The Mariner's Pocketbook. A Handy Reference Book for Navigators, Yachtsmen, Seamen, etc. By International Correspondence Schools. xxi and 324 pp. Many Diagrams and Index. International Text-book Company, Scranton, Pa., 1906.

A handsomely-printed book, fitted for the pocket and containing much of value, not only for seamen but also for students of mathematical geography and meteorology. It shows the use of logarithms, methods of determining latitude and longitude, how to construct a Mercator chart, treats of the deviation and dip of the compass needle, and the necessary compensations, and gives a large number of other facts and tables.

A New Geography of Japan, for the Upper Forms of Schools and Colleges. By C. D. Mitford. 32 pp. Maps and Illustrations. Japan Gazette Press, Yokohama, 1906.

A concise treatment of the islands in their various geographical aspects by a writer who is familiar with modern methods of writing and teaching geography. Special attention is given to physiography. In describing important cities, the physiography of the region around them is outlined. One map shows, what we seldom see in atlas sheets, the 84 provinces of the Empire clearly distinguished from one another by colour.

A Practical Manual of Tides and Waves. By W. H. Wheeler. viii, and 201 pp., 7 Appendices, Index, and 18 Illustrations. Longmans, Green and Co., New York, 1906. (Price, $2.80.)

This is a desirable addition to the books on physical geography. It gives a practical account, free from technicalities, of the action of the sun and moon in producing the tides and of the physical conditions by which tides are affected after their generation. A chapter is devoted to the history and development of tidal science. It received no large attention from the ancient astronomers, but the author shows how prominent were Copernicus, Kepler, Galileo, and Newton in its development. The relation of the sun and moon to the earth, a simple and practical discussion of the theory of tides, the propagation of the tidal wave, tidal currents, the range of tides—or, in other words, the difference in level between high and low tidal waters, river tides, tidal bores, wind waves, tide measurements, and tides as a source of power—are chief among the other topics discussed. The author points out the common error of calling earthquake and wind waves "tidal waves." A bibliography and tables make up the appendices. This practical handbook should be accessible to every teacher of physical geography. Unfortunately, there are many misprints, such as Cape La *Hague*, *Obydos* and *Abydos* (for Obidos, on the Amazon), *Tapagos*, Cape de Norte, *proroca*, and others. Cape Roque is printed for Cape St. Roque, and on page 145 Mr. Wheeler plays with the Pacific and the Amazon and geography itself in one line:

The Amazon enters the Pacific on the north coast of South America.

India and Her People. By Swami Abhedananda. 285 pp. and portrait. The Vedanta Society, New York. 1906. (Price, $1.25.)

The Swami Abhedananda, a native of India, is known best as a lecturer and writer on the Vedanta philosophy and religion. He has travelled extensively, spent a year in England, and has lived for the past nine years in the United States. This book, therefore, among many treating the same subject, has more than usual interest as coming from one who knows the Occident, and both knows and loves the Orient.

The book consists of lectures delivered before the Brooklyn Institute of Arts and Sciences during the season 1905-6. The subjects covered are the Philosophy and Religion of India, the Social Status of the Indian People, their Political and Educational Institutions, English Rule, India's Need, and, finally, the Reciprocal Influence of Eastern and Western Civilization. Each topic is treated from the historical point of view, present conditions being shown in relation to their origin and development. Thus, the lecture on "The Political Institutions of India" describes, first, the state of civilization existing among the ancient Indo-Aryans, and ample evidence is drawn from such Sanskrit writings as the Rig Veda, the Mâhabhârata, the Ramayana, the Laws of Manu; also the writings of Megasthenes, and the letters of Chinese travellers, to show that an advanced system of government prevailed in India before the beginning of the Christian era. Then the effect of successive invasions upon the development of political institutions is traced.

The author pictures graphically the poverty and suffering of the Indian people of to-day, and their need of greater educational opportunity. English rule is strongly criticized as "tyrannical," and this view is supported with statistical statements and quotations, especially from English writers and statesmen. Such facts as that India never knew a terrible famine until after the beginning of British rule; that the Indian Government spend annually only £750,000 for education of the natives, while the military expenses are nearly 36 times as great (nearly £27,000,000); that native in-

dustries have been crushed by prohibitive tariffs, and that, as stated in the Report of the Select Committee, "a large proportion of the revenue is annually drained away, without any return being made for it," while the people of India "have no voice whatever in imposing the taxes which they are called upon to pay"—these alone are sufficient evidence to justify severe censure. The Swami, however, expresses gratitude to England for the two benefits which, he acknowledges, she has conferred upon India: the reawakening of a national pride, and the chance to learn of the science, business enterprise, and culture of the West. As for religion, the Swami holds that the West has yet much to learn from India.

The book is decidedly interesting. Owing to the necessary brevity and popular nature of the treatment, many historical portions are too scantily filled in, and many statements which should be strengthened with a greater backing of facts are left with but little more weight than expressions of opinion. Still, for the student, the book has two admirable qualities: breadth in scope, and suggestiveness in material.

J. B. A.

Pictures from the Balkans. By John Forster Fraser. xii and 298 pp. Map, Illustrations, and Index. Cassell & Company, London, 1906. (Price, $2.)

Mr. Fraser is the British journalist who wrote "Canada As It Is," which was issued by the same publishers over a year ago (BULLETIN, 1905, p. 700). He has brought the same qualities of shrewd observation and lively description to the drawing of these pen-pictures from the Balkans—a region which, in every sense, is much more complicated than his earlier topic. The sketches are drawn from Servia, Bulgaria, and those western parts of Turkey commonly called Macedonia and Albania.

He says that Macedonia is little more than a name given to a tract of Turkish territory where, besides the Turks, lives a congeries of races, chiefly Bulgarian and Greek; and it is the hatred between the Bulgarian and Greek Christians that is responsible for a large part of the outrages to which so much attention has been called. All curse the Turk and love Macedonia, but it is Greek Macedonia or Bulgarian Macedonia. This bitter animosity between the Greek and Bulgarian Christians is responsible for the larger part of the ills of their country:

> The misrule of the Turk is bad enough, but to hand over Macedonia to the Christians of Macedonia to work out their own salvation would be to plunge the country into direst bloodshed.

The book makes no special appeal to the geographer, but it offers to the general reader many glimpses of the Balkans and their people that are most acceptable in these days, when good descriptions of that region are still few in number.

Ten Thousand Miles in a Yacht round the West Indies and up the Amazon. By Richard Arthur. 253 pp., and many Illustrations. E. P. Dutton & Company, New York, 1906. (Price, $2.)

This is a vivacious account of the yacht voyage made in the winter of 1904–5 by Mr. E. C. Benedict and his party of guests to Bermuda, the West Indies, and up the Amazon as far as Manaos, about 1,000 miles inland. It was Mr. Benedict's original intention to extend the journey to Iquitos, 2,200 miles from the ocean—a point that is reached by large steamers from Europe, but it was decided that practically every phenomenon of the river had been revealed in the first thousand miles, and that there was little to gain in experience or pleasure by going any farther. The journey was about 10,000 miles in length, and occupied 76 days.

Nothing geographically new could be expected from a narrative of this kind, but it is not often that the enjoyment, variety, and interest of a pleasure journey are more

charmingly described. Every facility was given to the distinguished party at the Amazon and island towns they visited to see everything worth seeing, and they were after information as well as pleasure. The book has been handsomely produced, and contains numerous fine photographs. The preface is written by Mr. William M. Ivins, the well-known lawyer, who, through residence, travel, and study, knows many things Brazilian. He expresses regret that the English books of value on Brazil were not all written by men who knew thoroughly the tongue, history, literature, or people of that country; so that we are not yet in real touch with their lives, national aspirations, customs, or civilization.

Alaska and the Klondike. By J. S. McLain. xiv and 330 pp., numerous Illustrations, Map, and Index. McClure, Phillips & Co., New York. (Price, $2.00.)

The author is a newspaper editor who was permitted to accompany the senatorial Sub-Committee that visited Alaska in the summer of 1903 for the purpose of collecting information that would be useful to Congress in its legislation for that district. Mr. McLain, therefore, enjoyed extremely favourable opportunities for studying the resources and prospects of the country during the ten weeks' trip through the interior, along the whole course of the Yukon, and to many places among the islands and on the coast that are not easily reached by the regular means of travel.

His book has two qualities that make it conspicuous among writings on Alaska. It has the solidity essential to the presentation of a large amount of reliable, late, and well-digested information; and it contains sufficient narrative, anecdote and description to make it interesting to a large circle of readers. It first tells the story of the trip along the coast and through the heart of Alaska. It then discusses the very important interests and questions relating to the country, such as the seal islands and the fisheries, transportation as the key to the locked-up wealth of Alaska, the political conditions, agricultural possibilities, the reindeer industry, the Indians, and the great goldfields of the Seward Peninsula and the Fairbanks district.

The predominant note is that Alaska is a wonderfully rich country. The author is even impressed with the probability that in the interior, where food supplies from the States must always be expensive, it will be practicable and profitable to produce meat, dairy, poultry, and garden products in sufficient quantity and at such prices as to solve the problem of development of large areas of gold-bearing gravel. This is very important, for the prospects are that before many years there will be hundreds of toilers in the Territory where there are tens to-day. The Sub-Committee was told in Nome that in this district about 20,000 gold claims had been staked out and recorded, and only about 500 of them were being worked to any extent. This represents a state of things general throughout Alaska, though it is not quite so accentuated in other sections as in the Seward Peninsula.

It is impossible to give an idea of the stores of information the book contains, but a few facts may be mentioned about the new Fairbanks district. The miners, not satisfied with the price of $16 an ounce for their gold, had it assayed, and found it to be worth $17.50, which shows that it is a finer quality than that of the Klondike and nearly as fine as the gold of Nome. It is more inaccessible, however, than at either of those places. In the Klondike and Nome regions the gold is often found exposed or very slightly covered along the beds of the creeks, but in the Fairbanks district there seems to be no gold in the creek bottoms; it lies up on the ledges and on the hillsides in a stratum of gravel two or three feet thick, and is located only after sinking shafts 10 to 20 feet from the surface.

We have scarcely appreciated the isolation of Nome in winter:

> The mining has stopped almost entirely, the ships come no more, half the people have gone "outside"; the rest eat and sleep and amuse themselves and wait for summer to come again.

This is the situation from November to June. The illustration of the book with half tones leaves nothing to be desired. The index is fairly adequate, but the map is a rough black-and-white sketch, without even a scale of miles. The book may be commended without reserve to all who are seeking information about Alaska.

Auf Alexanders des Grossen Pfaden. Eine Reise Durch Kleinasien. Von A. Janke. viii and 186 pp. 20 Illustrations from photographs, and 6 Plans from the surveys of W. v. Marées. Weidmannsche Buchhandlung, Berlin, 1904. (Price, M. 7.)

German army officers have been especially prominent in recent years in the exploration of Greece and Asia Minor. In 1902 Captain Janke, with three lieutenants, visited the ancient battlefields of Issus and the Granicus River, now known as Bigha Tschai. The attempt was made to work out from the ancient accounts of Alexander's battles with the Persians, and from studies of the topography, the sites of the battlefields, the dispositions of the contending forces, and the routes they followed through the country. Captain Janke made a diligent study of all the literature that might help his work. He gives important reasons for his belief that he has fixed the position of the battlefields of Issus and the Granicus; and, in addition to his researches in the path of Alexander, he explored, as far as possible, the valley of the Kor-kun-Su River, and followed a new route through the steppe between Eregli and Konia to the north of the route that appears on the Kiepert map.

Aus Papuas Kulturmorgen. Südsee-Erinnerungen. Von Stefan von Kotze. 227 pp. F. Fontane & Co., Berlin, 1905. (Price, M. 3.)

Mr. von Kotze has drawn upon his own experiences for this lively account of the beginnings of the German occupancy of New Guinea. He writes with humour, and also with biting sarcasm, of his recollections of those troublous days when the New Guinea Company was getting a foothold on the coast of Kaiser Wilhelm Land. The unlooked-for mishaps, the unexpected situations, the stupidity and blundering that marked much of everyday history, the demeanour of the natives, and the poor quality of a great deal of the scientific work done, are sketched with a lively pen. Dr. Reinecke, reviewing the book for the *Literatur Bericht* of *Petermanns Mitteilungen* (No. 280, 1906), says that many of the critical observations of the author are, unfortunately, only too true.

Bibliotheca Geographica. Herausgegeben von der Gesellschaft für Erdkunde zu Berlin. Bearbeitet von Otto Baschin. Band XI. Jahrgang 1902. W. H. Kuhl, Berlin, 1905.

The present issue of this invaluable annual has advanced another stage towards all attainable completeness. It contains over 10,000 titles in 20 languages, filling 531 pages. All geographical workers appreciate the great helpfulness of this laborious and very careful compilation, and it is gratifying to read in Mr. Baschin's preface that he expects further to reduce the long gap between the bibliographical year represented in each volume and the year of publication. The volume for 1903 is now so far advanced that it is expected to appear in a short time.

Great Britain. Handbook for Travellers. By K. Baedeker. (6th Edition, revised and augmented.) lxvi and 606 pp., 22 Maps, 58 Plans, a Panorama, and Index. Karl Baedeker, Leipzig, 1906. (Price, M. 10.)

The latest revision of the English edition of this well-known handbook, which in all respects has been brought down to date. It contains four new maps and nineteen new plans.

Conférences de Géologie. Par Marcellin Boule. 223 pp., Maps, Illustrations, and Index. Masson & Co., Paris, 1904. (Price, frs. 2.50.)

This book is in the "Cours Élémentaire d'Histoire Naturelle" and is intended for elementary classes in geology. There is no doubt that it is excellently adapted for this purpose. What it presents is the elements of geology simply told and with many interesting explanations. The physical world and its forms of life are described in some of the aspects which they presented during the several geological eras. The illustrations are especially excellent and very helpful to the text. At the end of the volume is a fine geological map of France in colours.

The Junior Geography. By A. J. Herbertson. 288 pp. and 166 black-and-white maps. The Clarendon Press, Oxford, 1905.

Herbertson's Junior Geography, being Vol. II of the Oxford Geographies, is devoted to the "Regional Geography necessary for the Oxford Junior Local Examinations." As would be expected, the larger attention is given to Europe, that continent being treated in 165 pages. The remaining space is devoted to a treatment of the other continents in a brief but generally effective way.

The treatment in every case is causal in order, the physical conditions being first considered as a basis for the life and economic conditions.

For a teacher who would have a handy reference volume for material on Europe to supplement her class work, no better book could be recommended. The diagrammatic maps are extremely effective, and are constantly referred to in the text, so that the reader is obliged to base his study on the maps—a very strong point in favour of the book.

An excellent index completes a most usable volume, attractive in form and content.

R. E. D.

Makedonische Fahrten. Von Adolf Struck. I.—Chalkidike. With 12 illustrations, 3 sketch maps in the text, and a route map. Heft 4, in the series, Zur Kunde der Balkanhalbinsel Reisen und Beobachtungen. A. Hartleben's Verlag, Vienna and Leipzig, 1906. (Price, M. 2.25,)

The present monograph only confirms the opinion, previously expressed in the BULLETIN, that this series is a very desirable addition to our limited literature on the Balkans. Mr. Struck travelled in Macedonia, of which the ancient Chalcidice forms the large southern peninsula, between 1898 and 1903, primarily for antiquarian research. His routes in Chalcidice (1901 and 1903) skirted the coasts of the main peninsula and two of its southern extensions, and also penetrated through the interior. His comprehensive paper is a description of the geography and people of the country and their present conditions. A good map accompanies the work, and the half-tone pictures vividly illustrate the topographic forms, the villages, and inhabitants.

In Africa. Victoria Nyanza e Benadir. By Cap. E. A. d'Albertis. 162 pp., 185 Illustrations from photographs, 2 Tables, 3 Maps, and Index. Istituto Italiano d'Arti Grafiche, Bergamo, 1906. (Price, L. 7.)

This book appears in the *Serie Viaggi* of the "Collezione di Monografie Illustrate." In our present knowledge of tropical Africa such works are of real service, because their graphic photographs and the information they give about newly-developing regions give us clearer ideas of the local geography and place us more closely in touch with the present phases of progress. Such fine photographs as that of Ripon Falls, where the Nile has its birth, of the wooded shores of Victoria Nyanza, with a steamer at anchor off the shore, of Waganda bringing canoe loads of bananas and other fruit to the markets, and scenes along the line of the Uganda Railway, are very interesting, because they are novel and informing. The pictures include excellent panoramas of the entire water front of some of the coastal and island cities, as Zanzibar, Brava, and Mombasa. The letterpress is a simply written description of the regions, towns, and peoples visited. A picture of pathetic interest shows the wreck of the little steamer in which the explorer von der Decken was ascending the unknown Jub River when he was killed by the fanatical natives in 1865. The deck, barely out of the water, is covered with vegetation, which has clambered half way up the smokestack.

Europa. Zweite Auflage. Von Professor Dr. Alfred Philippson. xii and 761 pp. 14 coloured Maps, 22 Tables, Coloured Plates, 144 other Illustrations, and small maps in the text. In the series, "Allgemeine Länderkunde," Edited by Prof. Dr. Wilhelm Sievers. Bibliographisches Institut, Leipzig and Vienna, 1906. (Price, M. 17.)

This volume offers probably the best description of Europe in similar compass that has yet appeared. It differs largely from the first edition. The chapters on the general geography and topography have been entirely rewritten, the general survey of the continent has been extended, larger attention has been given to the industrial, cultural, and politico-geographical conditions of the several countries, and the pictures are more numerous and more of them are reproduced from photographs. The fact that Professor Alfred Philippson had charge of the preparation of the book, assisted to some extent by Professor Ludwig Neumann, is an assurance of skilful selection of material and scholarly treatment which will not be at all impaired by careful perusal.

The volume opens with a general review of the continent, the special reasons for its importance, its position, boundaries, size, and articulations, its topography, hydrography, climates, flora and fauna, the population, with their religions, states, culture, industry, settlements, and density; and the means of communication in Europe, and with other parts of the world, the whole filling 135 pp.

The second section (249 pp.) describes the territory occupied by the mountain systems of southern Europe with their high or low plains and their populations and development, thus establishing, in this treatment of the subject, the close relations between man and his environment. The six subdivisions of this section are the Alpine Lands, the Carpathian Lands, the Balkan peninsula, the Greek peninsula and its islands, Italy, and the Iberian peninsula.

The third section (244 pp.) is similarly devoted to the farming lands (Schollenland) of Northwest Europe, and section 4 (70 pp.) to the Russia-Scandinavian tablelands with their surmounting mountains and the Russian low plain. The volume closes with a comprehensive bibliography of the most important literature relating

to Europe, and an excellent index. The large coloured maps are admirable and have been brought down to date. Our teachers who read German will find this book full of apposite and suggestive material for the amplification of class-room topics, and the classified bibliography will form a comprehensive and convenient guide to the most authoritative publications on all phases of the geography of Europe.

In Northern Seas. Mr. Alfred Searcy's Experiences on the North Coast of Australia. By E. Whitington. Adelaide, 1905.

Newspaper articles reprinted in a pamphlet and relating to the adventures and observations of Mr. Searcy during his fourteen years in the Government service at Port Darwin and other places on the northern coast of Australia. The people of South Australia are particularly interested in the prospects of their Northern Territory, as the coming completion of the transcontinental railway is expected to give an impetus, at no distant day, to the development of tropical agriculture and the pastoral and mineral industries in that region. Mr. Searcy's descriptions of the natural scenery and fauna of this remarkable country are said to be accurate, and the attractions of the land, as he presents them, are declared by those who have been there to be all that he describes. There are a considerable number of characteristic pictures. The pamphlet suffers somewhat from the diffuseness of the newspaper style.

Dans le Bled es Siba. Explorations au Maroc. Par Louis Gentil. xv and 364 pp., Illustrations, Appendix, and Index. Masson & Co., Paris, 1906. (Price, $2.40.)

Mr. Gentil was the geologist of the latest Segonzac expedition in Morocco. It was a fruitful expedition in spite of the brief captivity of its leader in the hands of professional pillagers. Each member of the party had his own work, and Gentil's observations on geology and topography were made in the company only of his personal attendants. He made a short expedition between Tangier and Tetuan and four separate journeys in the western part of the main Atlas and the coast region south of Mogador. The last journey, which involved considerable hardship, led south from Demnat across the Atlas range, during the passage of which Gentil discovered the first fossils by which it will be possible to determine the age of the ancient axis of the range in these parts. On the southern slopes he also met with fossils of a fine carboniferous fauna. Throughout his journey he paid large attention to physiography, and his book treats largely of the genesis of the land-forms.

A geologist and geographer of attainments, Gentil entered a prolific field for pioneer scientific observation, and he was well qualified to observe and describe. The result is an exceptionally good book, and one of the best recent works of exploration. The publishers have produced it in a most excellent manner. The beautiful half-tone illustrations give a very large number of graphic views of the physiographical aspects along the explorer's routes. Unfortunately, not even a sketch map has been provided to show his routes.

Some Facts about the Weather. By William Marriott. 8vo. London, 1906. pp. 32.

A "popular meteorological handbook," to quote part of the title, prepared by the assistant secretary of the Royal Meteorological Society, published at the low price of sixpence. We take it that this little volume covers about the ground of the popular lectures on meteorology given under the auspices of the Royal Meteorological Society at agricultural and other exhibitions, schools, etc., during the past few months. Some information is given regarding the more important meteorological phenomena, and a few illustrations make the text clearer. R. DEC. W.

The Connecticut River and the Valley of the Connecticut. Historical and descriptive. By Edwin M. Bacon. xx and 487 pp. 60 Illustrations from Photographs, Index and Map. G. P. Putnam's Sons, New York, 1906. (Price, $3.50.)

From a geographical point of view, this informing volume seems open to some criticism, not because the geography of the Connecticut River and its valley is not set forth in considerable detail, and in a manner calculated to interest the general reader, but because the geographical section is reserved for the last 118 pages of the book. The geography of the valley was one of the most important influences in shaping the history of its settlement and development. The seceders from the Boston or Bay Colony partly explain their removal to Connecticut by the facts (1) that there was lack of accommodation for their cattle, the settlements being so close together that they were not able to maintain their minister or receive any more of their friends; and (2) "the fruitfulness and commodiousness of Connecticut." It was the lack of land around Boston and the plenitude and the good quality of it in the Connecticut valley that supplied two of the three reasons by which the settlers justified their removal.

Geography is usually recognized by writers of to-day as one of the most important bases of history. The tendency now is to give full prominence to all the influences exerted by geographical environment upon the development of every form of life and the shaping of human activity. The pleasure of reading the story of the Connecticut River and its valley might have been enhanced if the introductory chapters had made clearer the physical conditions under which this history was evolved and the author had called attention, here and there, as might have been done without tediousness, to the continual interaction between human activity and geographical environment that largely made this history and shaped the destinies of the teeming valley.

The history of the valley from the discovery of the river by Adriaen Block, the Dutch navigator, in 1614, to the close of the eighteenth century fills 300 pages, or about three-fifths of the book. It is a stirring and well-told recital of many phases of life of which one of the fairest valleys of the country was the scene—the Indian and colonial wars, the pioneer development of improvements and industries, the evolution of democratic government, and the planting of more colleges and higher schools than are to be found on any other river of the world. The author consulted many original authorities, and, as the result of this research, he has given new readings of popular history in a number of instances.

The second part of the book deals admirably with the development of transportation on the river, and from this material a few facts may be condensed here:

> Navigation by white men was first confined to the sixty miles between the river mouth and the head of tide water below Enfield Falls. After the English colonists arrived, the flat boat or scow, which could run the Enfield rapids at high water, was contrived, and then navigation was extended to Springfield. Above that point commerce was carried on the river between the falls through the Massachusetts Reach by canoes, or flat boats, till the middle of the eighteenth century. The far northern reaches were navigated by the hunter, trapper, and soldier, long before that time. The earliest traffic was in furs, skins, and hemp, brought in by the Indians. As settlements advanced above the Massachusetts line, larger flat boats were operated between the various falls, freight being unloaded at the foot of each fall, and transported around it by teams. The river was the first (1791) in America to be improved by canals and locks around the falls (1791). The first steamboats in regular service on the lower river began to ply about 1824.

In the topographical section the author gives not only a summary of the geological and physiographical features but also a pen-picture in detail of the

river from its headwaters to Long Island Sound. He quotes the tribute that Timothy Dwight paid to the greatest of New England streams when he wrote in part:

> This stream may perhaps with more propriety than any other in the world be named the Beautiful River. From Stuart to the Sound it uniformly maintains this character. The purity, salubrity, and sweetness of its waters; the frequency and elegance of its meanders; its absolute freedom from aquatic vegetables; the uncommon and universal beauty of its banks, here a smooth and winding beach, there covered with rich verdure, now fringed with bushes, now covered with lofty trees, and now formed by the intruding hill, the rude bluff and the shaggy mountain, are objects which no traveller can thoroughly describe and no reader can adequately imagine.

The author is to be congratulated upon this result of his painstaking research and literary effort. He has well described and adequately told the story of the River Beautiful throughout its 350 miles from mountain to sea. Nothing has been left undone by the publishers to make the large book attractive. It is unexceptionable in paper, typography, and illustrations. Sized paper is reserved for the full-page photographs, so that the eye is not constantly affronted with glaze, and the book is not so heavy that handling it is a kind of muscular exercise which should be reserved for athletics.

Die Herero. Ein Beitrag zur Landes-, Volks-, und Missionskunde. Von Missionar I. Irle. viii and 352 pp. 56 Illustrations, Map and Index. C. Bertelsmann, Gütersloh, 1906. (Price, M. 5.)

The author was engaged in missionary work among the Herero in German Southwest Africa for thirty-four years. The veteran pioneer wrote this careful and full account of the country and people in great sadness of heart, because many of the fruits of his hard labours for a generation were swept away by the recent war, which resulted in the terrible punishment of the natives. The book is written with conservative judgment and fulness of detail. About a tenth of it is given to an excellent description of the geographical features of the land; the second section to the Herero, in which their history, character, speech, and religion are described, and special attention is given to their family life, social condition, arts, and customs. The Bergdamara and Bushmen, the trade, the wars, and German rule are described in the same section, and the concluding third of the book is devoted to missionary work among the Herero.

Erdkunde fur höhere Lehranstalten. Von Dr. Adolf Pahde. (III Teil: Mittelstufe, zweites Stück.) Second edition. v and 172 pp., 14 Illustrations, and Index.

This part of Dr. Pahde's text-book deals with the oceans and all the continents, excepting Europe, and there is a special section on the German colonies. It is more full of information than even our own text-books. A notable and commendable feature is the insistence that school atlases shall be used in connection with the text. There are very few pages on which the student is not referred to one or another of the leading German school atlases to study the cartographic delineation of facts given in the text.

THE HANDY WORLD ATLAS AND GAZETTEER. 120 Maps, and a Gazetteer. Frederick Warne & Co., New York (not dated). (Price, 40c.)

A pocket atlas, of which the maps were made by Bartholomew, Edinburgh, and are good for the small scale. The European countries, and especially Great Britain and Ireland, have many more pages than any other lands, showing that

the atlas was primarily intended for British use. Six of the small plates are, however, given to the United States, and New York and Chicago and the regions around them are given on a comparatively large scale. Six Mercator charts show the distribution of the most important commercial products, and there are also physical, climatic, and vegetation maps. The place-names on the maps are sufficiently numerous and important to make the little book (which may easily be carried in a pocket) frequently useful for ordinary purposes. The Gazetteer devotes one line to each of about 10,000 of the most important places of the world. The Polar charts are sufficiently recent to show the latest explorations in the polar regions.

Baluchistan. By Colonel C. E. Yate. Read on February 14, 1906, before the Central Asian Society. 39 pp., including discussion. London, 1906.

This is a description, chiefly administrative and political, of Baluchistan, of which Col. Yate was Chief Commissioner from 1900 to 1904. Baluchistan is not much less than three times as large as New York State; and as it is a factor in questions relating to India, Afghanistan, Persia, and Russia, it will be profitable to present here some of the authoritative facts given in Col. Yate's paper.

Only the northeastern part of the country, or a little more than one-third of the whole, is directly administered by the British Government. This region is divided into the five districts of Zhob, Loralai, Sibi, Quetta-Peshin, and Chagai, and it is governed by five district officers with four assistants, or nine British officers, all told. In view of the importance of Baluchistan both in a political and military sense, the wildness of the tribesmen and the continual fights, disputes, and disturbances, Col. Yate believes that the British element in the administration is not sufficiently strong.

The Government of India is endeavouring to stimulate education among the upper classes of the province. It has given special grants for the construction of a boarding-house to be attached to the Sandeman High School at Quetta for the accommodation of the sons of Sirdars and headsmen who may be sent there for their education; also for the construction of a library and museum which has been erected at Quetta. At the suggestion of Col. Yate, the chiefs, officials, and people of Sibi erected a large hall in 1902 in memory of Queen Victoria. Thus Baluchistan is gradually becoming provided with public buildings. All this relates to the northern part of the province, which may be called British Baluchistan.

The southern and larger part of the province is all native territory, and in this region, nearly 80,000 square miles in extent, the British have only one political agent with two assistants. The Khan of Kalat is the nominal ruler of the country, but, after all, he is only *primus inter pares* among all the Brahui and Baluch Sirdars of whom the Kalat confederacy is composed. The power of the tribal chiefs has increased, and the power of the Khan, as the leading factor in the country, is no longer what it formerly was.

The Baluchis and Brahuis of Southern Baluchistan are large camel and sheep owners, and are nomads and graziers more than cultivators. Col. Yate says that camel registration for possible use in war has been successful beyond expectations, and arrangements have been completed for the enlistment of many camel corps both from Pathans and Baluchis, in case of necessity. A complete camel corps was enlisted and sent to Somaliland, two years ago, within ten days, and many such corps could be enlisted and sent off to any part of the world with equal celerity. Many of the camelmen in Western Australia are from Baluchistan.

Col. Yate discusses at length the relations between Persia and Baluchistan, and considers it unfortunate that Persia was permitted to annex what is now known as Persian Baluchistan, over which the Government is able to exercise little control, so that the Indian Government has been put to the trouble and expense of sending troops into this lawless region to do work that the Persians should do for themselves. He also deals with the question of Persian and Russian railroads.

Rome. A Practical Guide to Rome and its Environs. By Eustace Reynolds-Ball. viii and 256 pp., 8 illustrations in colour, plans of the Forum, Vatican and Rome. Bibliography and Index. The Macmillan Company, New York, 1906. (Price, $1.00.)

This book differs in some respects from most guide-books. It is discouraging to the hurried tourist who has only a few weeks to spare to find how thinly he must skim over the surface of things in Rome, though it is richer than any other city in the world in objects of archæological, historical, artistic and religious interest. This book is especially planned to help tourists who wish to get the most profit and enjoyment that is possible in a few weeks' stay. ' It does not neglect the interests of the more leisurely traveller, but the chief mission of the book seems to be to convince the person who must catch his steamer that he may see, enjoy, and learn much if he will omit everything but the best and keep mainly to that which interests him most, whether it be antiquities, art, architecture, or churches.

In the first place, the book tries to save time by giving unusually full and precise details on practical matters, such as routes, hotels, etc., condensed into 22 pp. of small type. The chapter on hints for sight-seeing concludes with a plan for "doing" Rome in a fortnight, in which the places and monuments that must not be omitted if the stay is only for a week are in bold type. Then follow 217 pp. on the sights of the Eternal City classified in sections as "Ancient and Mediæval Rome," "Renaissance Rome," and "Ecclesiastical Rome," with additional chapters on excursions, the residential parts of the city, etc. The method—in the Forum, for example—is to call attention only to the more important or best-preserved monuments. The pictures in colours by Alberto Pisa are striking, and the map (in pocket) shows all important features numbered with reference to a list in the margin.

Baku. An Eventful History. By J. D. Henry. xvi and 256 pp., 31 Illustrations, Map and Appendix. Archibald Constable & Co., Ltd., London, 1906.

A small area around Baku is the greatest single centre of petroleum production in the world. The magnitude and importance of these Russian oil fields have long been known, and Mr. Henry, who, from his intimate acquaintance with the petroleum industry, is well qualified for the task, has rendered a service by describing the industry as it exists to-day. He sums up the reasons for believing the Baku oil enterprises will have far larger expansion. He supplements and brings down to date the vivid description of the Baku oil industry written by the late Charles Marvin twenty years ago.

The book gives the history of the city and its industry, describes the great spouting wells, with new facts concerning the later history of these phenomena, records fresh information about men and methods at the oil fields and in the refineries, and

gives a long account of the recent massacres and destruction of property which have somewhat arrested the progress of the Caucasian oil business.

But Mr. Henry has the greatest faith in the future of these oil fields. He writes:

> In no part of the world have I seen an oil region the compeer of these old and famous fields at Baku, an oil city that can equal in wealth this metropolis of the Caucasus, or a body of oil men who surpass in energy, enterprise, or business capacity those who are at the head of the industry in Baku.

Some of the geologists appear to have been seriously wrong in their calculations. Professor Abich predicted that oil would not be found at a greater depth than 60 or 70 feet, and that the introduction of steam drilling would not be beneficial to Baku. Trautschold, who visited Baku in 1873, was confident that oil of commercial value would not be struck below 200 feet and that the oil would decline in value as the drill went below 140 feet. The most prolific wells of to-day, however, are between 1,500 and 2,000 feet, and the hand-dug wells, favoured by Abich, were discarded as far back as 1878. The most productive wells are at Bibi-Eibat, which, though numbering only 222, or about a tenth of the wells in the peninsula, are yielding nearly a third of the total production.

In Mr. Henry's opinion there will be an early expansion of the oil fields of Russia. New fields are being opened on every hand. The industry is already recovering from the recent terrible events, when so much property was destroyed and hundreds of Armenians were ruthlessly butchered by the Tartars. The work of rebuilding the derricks, cleaning out the wells, and erecting drilling and pumping machinery is being pushed with all possible speed. An interesting chapter is given to Batoum, the world's largest shipping port for oil; and the trade in the Russian commodity is fully treated. This is a good and useful book.

Bedeutung und Aussprache der wichtigsten schulgeographischen Namen. Von Dr. A. Wollemann. 68 pp. Wilhelm Scholz, Braunschweig, 1905. (Price, M. 1.)

This pamphlet defines about 2,300 of the more common and important geographical names of peoples and nations, as well as places, rivers, terms used in physical geography, etc. In his short and sensible introduction Dr. Wolleman shows once more how illogical it is that the name of a country or a city should change with the language in which it is written. How much better, he says, if *Deutschland* were the universally accepted name for *Germany* and *Milano* for *Milan!* He does not labour this point, and that is well, for the obstacle in the way of uniform usage is the existence of different languages; an illogical, but a human condition which will last as long as the world.

The arrangement of the names is alphabetical under each country or region of Europe, and in one alphabet each under Asia, Africa, Australia, and other heads.

Dr. Wolleman says of San Francisco:

> Originally named after the English navigator Sir Francis Drake, who anchored here in 1579.

Prof. George Davidson, of the United States Coast and Geodetic Survey, read before the California Historical Society in 1889 a paper setting forth his conclusion, after many years' study and personal examination of the coast, that Drake never saw San Francisco Bay. The paper was published in 1890.

The city was undoubtedly named after St. Francis of Assisi.